LEVEL II

UPPER HUDSON RIVER BASIN

20

AD A068546

CONKLINGVILLE DAM

SARATOGA COUNTY, NEW YORK
INVENTORY NUMBER NY 146

PHASE 1
INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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CONTRACT NO. DACW-51-78-C-0025

Prepared by

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615 W. Highland Ave. Ebensburg, Pa.

Prepared For

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
NEW YORK, NEW YORK

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Visual Inspection	Conklingville Dam
Hydrology, Structural Stability	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Conklingville Dam was judged to be safe, although evaluation of the embankment under seismic loading was recommended.

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Table of Contents

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Conklingville Dam (Great Sacandaga Lake)

State Located: New York

County Located: Saratoga

Stream: Sacandaga River

Date of Inspection: June 16, 1978

ASSESSMENT

The inspection and review of data of Conklingville Dam did not reveal any problems which require immediate emergency action. The dam appears to be stable, well maintained, and safely operated.

The reservoir and spillway are adaquate to control the PMF with eight (8) feet of freeboard remaining.

The hydraulic fill (puddle core) type construction in a moderate seismic zone and the lack of information on construction, embankment materials, and stability analysis dictate that evaluation of the embankment under seismic loading be completed in the future.

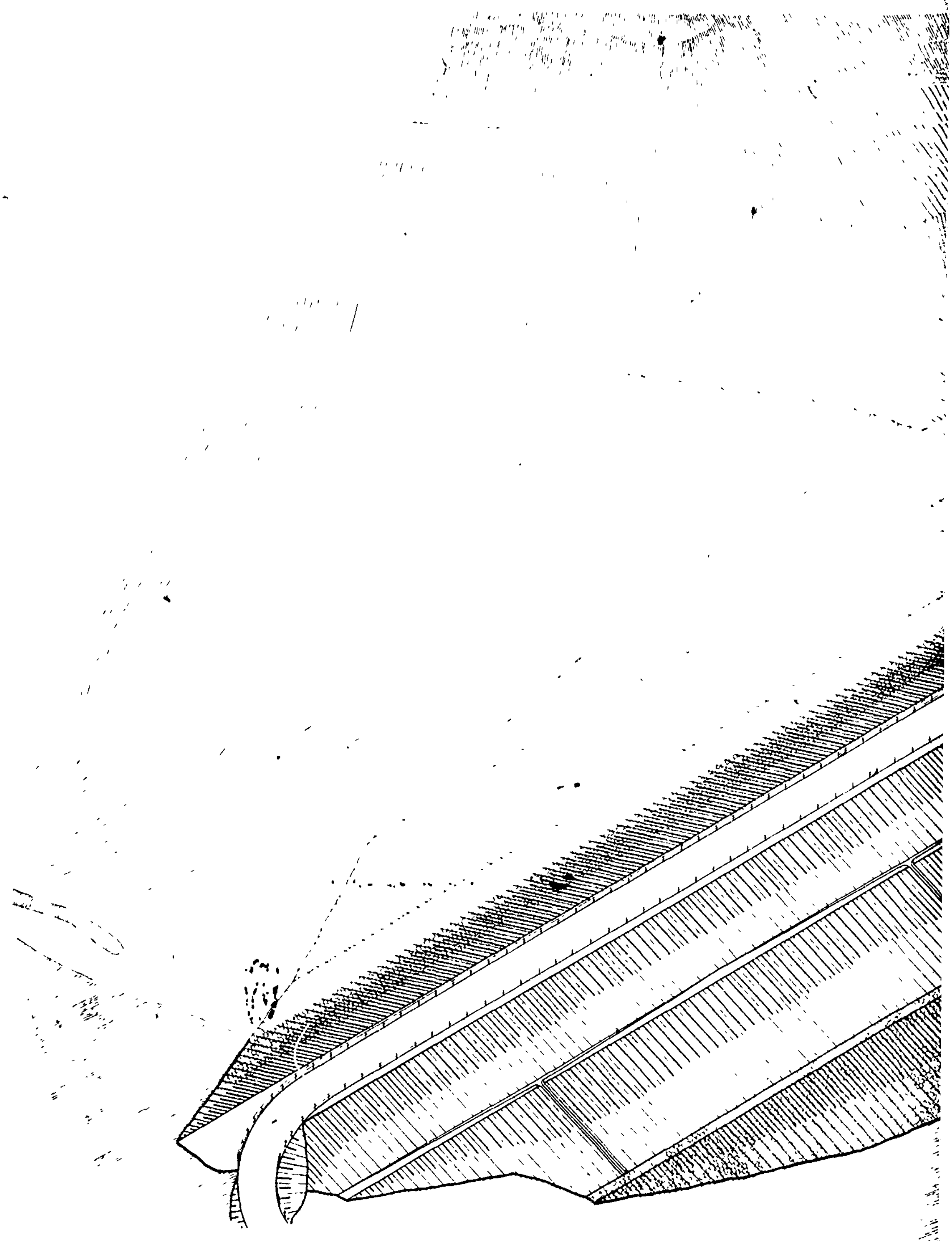
Replacement of rock rip rap at the downstream end of the principal spillway discharge should be completed to prevent further erosion during peak discharge periods.

Approved by R. Jeffrey Kimball
R. Jeffrey Kimball, P.E.
L. ROBERT KIMBALL & ASSOCIATES
Registration No. PA 26275E

Approved by Clark H. Benn
CLARK H. BENN
Colonel, Corps of Engineers
District Engineer

Date: 31 July 1978

OVERVIEW OF DAM FROM
LOOKOUT ON LEFT ABUTMENT



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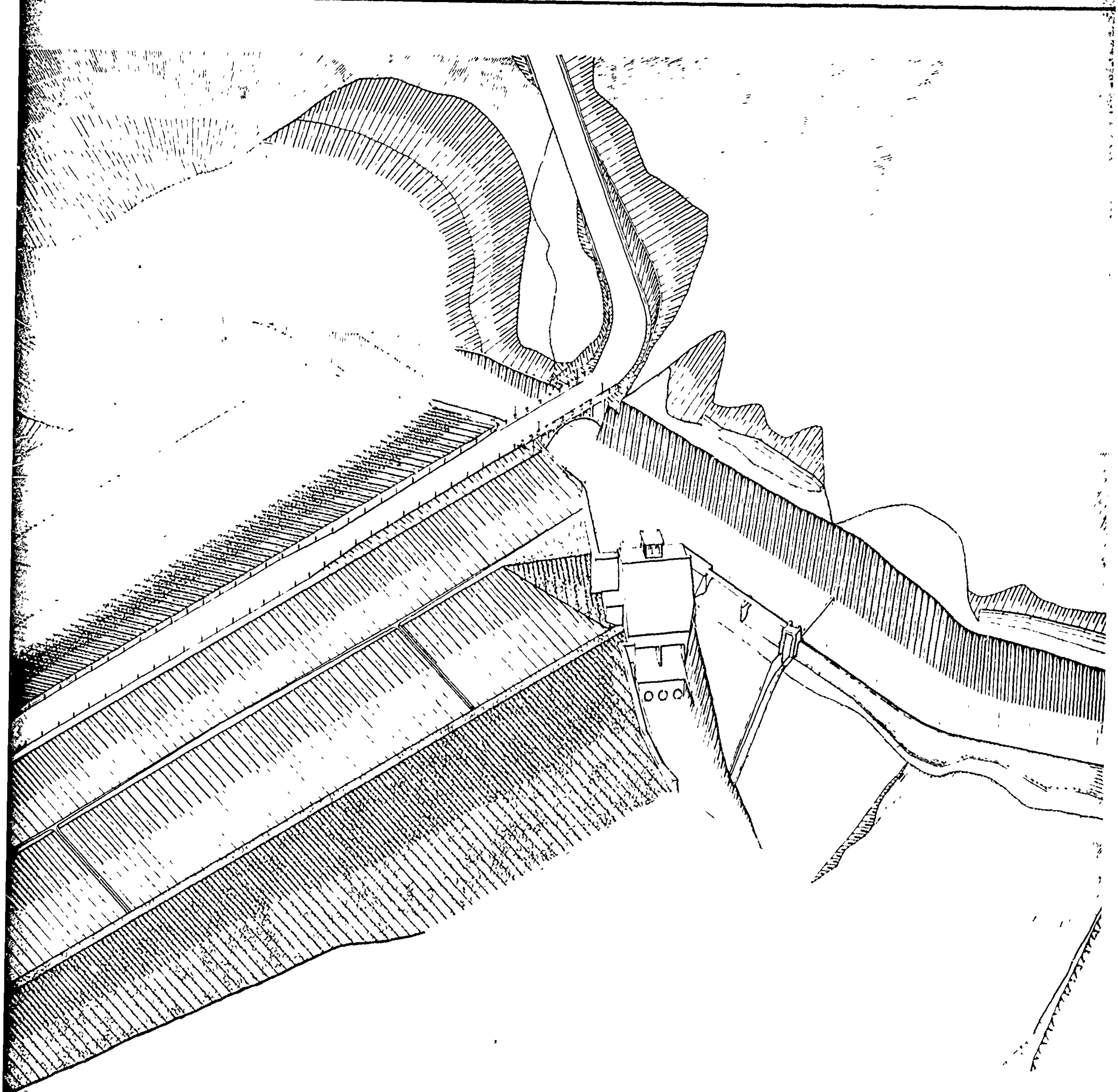
CHECKED- Schauffler

Melvin E. Casler
DESIGNING ENGINEER



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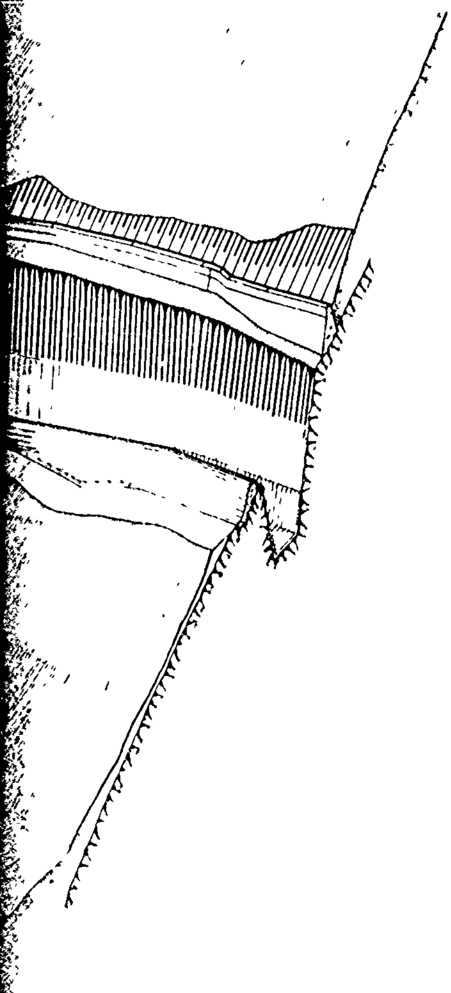
Albert J. Crane
CONSULTING ENGINEER



STATE OF NEW YORK

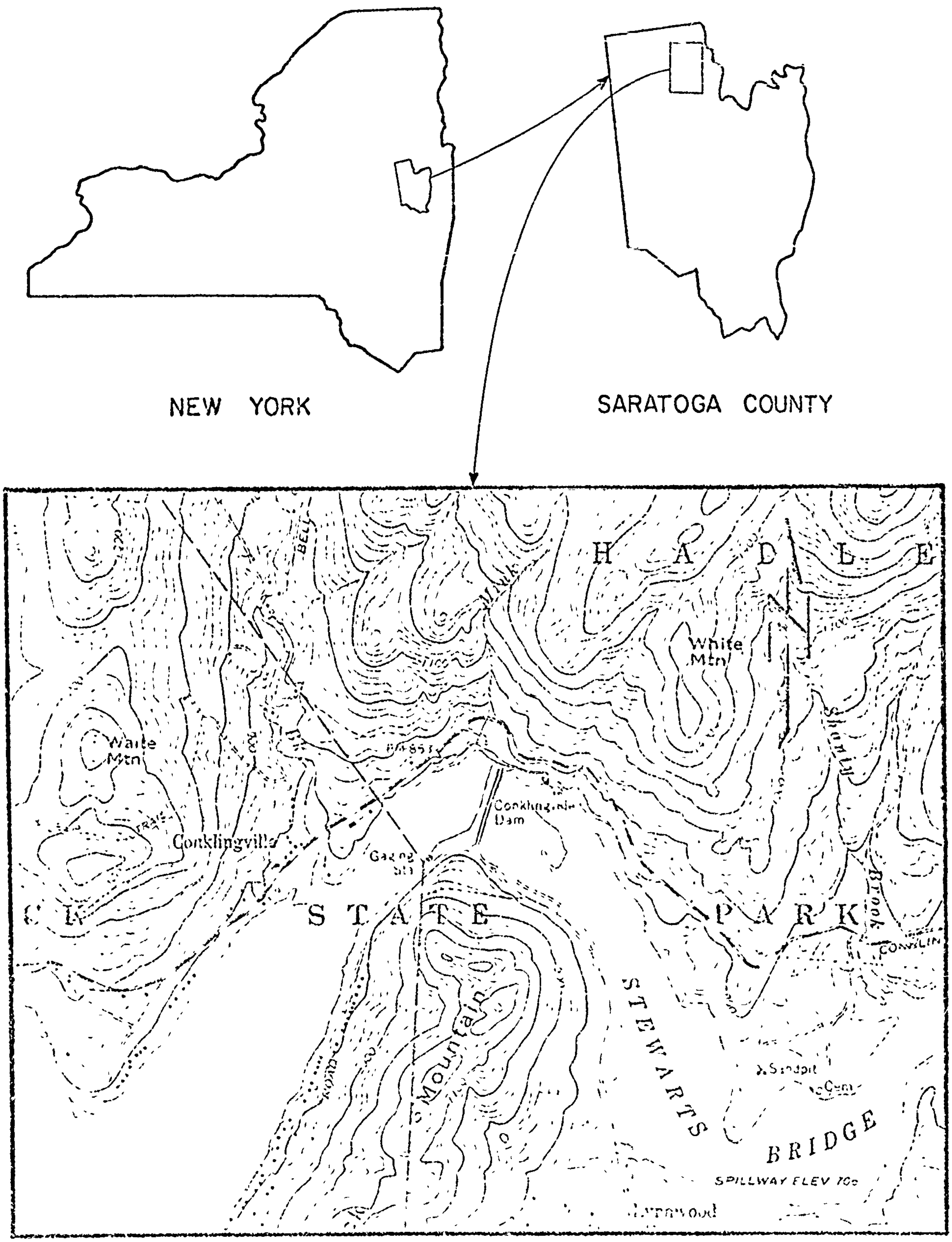
HUDSON RIVER REGULATING DISTRICT

SACANDAGA RESERVOIR

CONKLINGVILLE DAM

ISOMETRIC VIEW

SEPT 1927



Portion of Conklingville, New York 7.5 minute U.S.G.S. quadrangle

CONKLINGVILLE DAM

SITE LOCATION MAP

SCALE : 1" = 2000'

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CONKLINGVILLE DAM ID #146

SECTION 1: PROJECT INFORMATION

1.1 General:

a. Authority: Authority is provided by the National Dam Inspection Act Public Law 92-367.
Contract Number DACW51-78-C-0025

b. Purpose of Project: Evaluation of non-Federal dams to identify dams which are a threat to life and property.

1.2 Description of Project:

a. Description of Dam and Appurtenances: The Conklingville Dam (Great Sacandaga Lake) is a zoned earth and rock fill dam. The embankment is 96 feet high constructed with upstream and downstream rock toes and random earth zones with a central puddle core. The impounded lake is currently used for flow regulation in the Hudson River, recreation and hydropower production.

The emergency spillway system is an ogee weir 400 feet long. The spillway is located at the left abutment downstream of the dam axis. Water enters the spillway through a channel at the left abutment. This channel also feeds the principal spillway, the siphon spillways and the powerhouse.

The siphon spillways, two 8' x 18' openings, can be considered part of the emergency spillway system as they are designed to prime with 2' of head over the emergency spillway crest elevation. This condition has not been experienced and the siphons not utilized.

The principal spillway system, day to day, regulating controls, is a two part system. The portion designed with the dam consists of three 8 foot diameter steel pipes with controls located in the gate house at the left abutment along the emergency spillway channel.

The second portion of the principal outlet works is the hydropower station located at the end of the emergency spillway channel. Water from the dam feeds two turbines at the average rate of 4,000 CFS 15 hours a day. The powerhouse normally serves as the regulating facility with the three 8 foot diameter pipes used on an as needed basis.

c. <u>Elevations (Feet above MSL)</u>:

Top of Dam : 795.0'

Maximum Pool Design Surcharge: 778.95

Emergency Spillway Crest: 771.0

Streambed at Centerline of Dam: 699.0

Maximum Tailwater: Approximately 710

d. <u>Reservoir</u>:

Length of Normal Pool: Elevation 771 - 27 miles

Length of Maximum Pool: Elevation 794.5 - 28 miles

e. <u>Storage</u>:

Normal Pool: Elevation 771 - estimated 1.16 million acre-feet

Design Pool: Elevation 778.95 - estimated 1.36 million acre-feet

Top of Dam: estimated 1.81 million acre-feet

f. <u>Reservoir Surface Area: (Acres)</u>

Top of Dam: 28,800

Normal Pool: 25,200

g. <u>Dam</u>:

Type: Earth and rock fill

Length: 1,100 feet

Height: 96 feet

Top Width: 43 feet

Side Slope: Upstream 3:1 to 4:1
Downstream 2.5:1 to 4.25:1

Zoning: Sluiced Core with earth zones and rock zones

Inpervious Core: Sluiced core

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures: Conklingville Dam is maintained and operated by a full-time staff stationed at the dam with support from other dam staffs of the agency.

The dam is operated for several purposes. The primary purpose is regulation of flow in the Hudson River and flood control. Secondary uses are power production and recreation.

Under normal conditions flow is discharged to the Hudson River via the Stewarts Bridge Reservoir through the hydropower station at an optimum rate of 4,000 CFS. A flow of 3,000 CFS must be maintained to the river. However, the power plant is regularly not operated around the clock or every day.

As necessary, during flood seasons the principal spillways are used to lower the reservoir level in a controlled manner. The average low water level in winter is elevation 744' (27 feet below the spillway). The average high in spring is elevation 767' (4 feet) below the spillway. The maximum water level to date is 770.75'.

4.2 Maintenance of Dam: The dam is well maintained by a conscientious staff. Mowing, and other maintenance are performed as needed.

4.3 Maintenance of Operating Facilities: Maintenance of the principal spillway structure is conducted as needed, and the gates are operated regularly.

4.4 Warning Systems: No formal warning system is in use.

4.5 Evaluation: The dam and appurtenant structures are well maintained. Periodic inspections are made of the entire structure and reports prepared. Detailed operational and maintenance records, and rainfall and discharge records are kept.

Cutoff: Cutoff of sluiced core approximately 20 feet deep.

Crout Curtain: Asphalt grouted in 1933.

h. Diversion and Regulating Tunnel: During construction river flow passed by an open channel at control house. The three 8' diameter pipes eventually installed in the open channel.

Type: Three 8' diameter steel flanged pipes

Length: 62 feet

Closure: Operabled by three valves with electric motors.

Access: Valves operated in control house. If motors fail the valves can be operated manually in valve chamber.

Regulating Facilities: Valves only opened during flooding.

i. Spillway :

	Emergency Spillway	Siphon Spillway
Type:	Concrete ogee	Concrete ogee
Length of Weir:	400'	36'
Crest Elevation:	771.0'	773.0'
Gates:	None	None

U/S Channel: Rock cut with concrete retaining walls

D/S Channel:	Outlet channel 30' wide then to Sacandaga River	70 ' drop to Sacandaga River

j. Regulating Outlets: Combination of three 8' diameter pipes and gates at powerhouse.

Form 66. 6-6-41—1000

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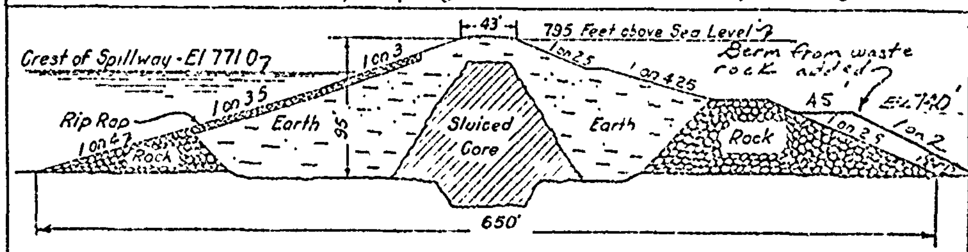

CONKLINGVILLE DAM

670,000 Cubic Yards of Earth Fill
120,000 Cubic Yards of Rock Fill
200,000 Cubic Yards of Rock Excavation
15,000 Cubic Yards of Concrete
Length of Dam 1100 feet
Spillway - 400' Weir and 2 - 8' x 18' Siphons

SACANDAGA RESERVOIR

Area - 27,000 Acres 42.3 Square Miles
Capacity - 37.8 Billion Cubic Feet - 283 Bil Gallons
Length 27 Miles
Width - 3000 to 28000 Feet.
Length of Shore Line - 125 Miles.
Flow Line Elevation 771.0' above Sea Level

SECTION 3: VISUAL INSPECTION

3.1 Findings:

a. General: Conklingville Dam was inspected by personnel of L. ROBERT KIMBALL & ASSOCIATES and the Hudson River - Black River Regulating District on June 16, 1978.

b. Dam: The dam appears to conform closely to the construction drawings. In general the dam appeared to be well constructed and well maintained. The dam did not appear to be in distress and no settlement or seepage zones were noted at the time of our inspection. Some heavy rock has been washed out near the outlet channel.

c. Appurtenant Structures: All spillways, gates, valves, and control house appeared to be in good condition and well maintained.

d. Reservoir Area: The dam retains the waters of the Sacandaga River. The valley bottoms are generally covered with thick glacial sediment and the valley sides are covered with a thinner layer of soil.

e. Downstream Channel: The downstream channel is wide and open. Stewarts Bridge Dam is approximately three miles downstream and tailwater of this dam will backup to Conklingville Dam.

3.2 Evaluation: Visual inspection revealed that the dam appears to be stable and in good condition. However no stability information was available for review. No seepage or settlement was noted during our inspection. The downstream berm appeared to have been modified during construction (the berm widened and steepened). Some washout of the heavy rock near the outlet channel was noted.

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SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Hydrologic Evaluation of Features:

a. Design Data: Some discussion of the spillway design is available in old reports on the dam. These reports indicate a 600 foot long spillway was originally contemplated for a maximum design peak of 50,000 CFS and a maximum water level of 7 to 8 feet allowing for 16 feet of freeboard.

No design information is available on the as built spillway.

b. Experience Data: Reservoir water level and discharge records are kept. To date the maximum discharge at the site is estimated at 10,000 CFS, from flow to the powerhouse and two of the three 8' diameter principal spillway pipes. To date no flow has been recorded over the ogee weir, therefore no flow into the siphon. Only two of the three principal spillway pipes have been opened at one time.

The "Upper Hudson and Mohawk River Basin Hydrologic Flood Routing Models" study prepared by the Corps of Engineers, New York District modeled the 1948, June 1972, SPF, and transposed Agnes floods for the watershed. Hydrologic parameters developed in this study were used to develop the SPF and PMF for this study.

c. Visual Observations: At the time of the inspection discharge was to the powerhouse only (approximately 4,000 CFS) and the water level was at elevation 766.15 approximately 5 feet below the spillway weir.

The rock slope below the spillway was gunnited and has an appearance of weathered rock. The gunnite has deteriorated but not to a point where it will affect spillway function. The gatehouse and mechanical equipment are in good condition.

d. Overtopping Potential: To determine the overtopping potential for Conklingville Dam, flood routing was conducted.

This potential was investigated through the development of the probable maximum flood (PMF) for the watershed and the subsequent routing of the PMF through the reservoir system. The PMF is that hypothetical flow induced by the most critical combination of precipitation, mimimum infiltration losses, and concentration of run-off at a specific location, that is considered reasonably possible for a particular drainage area.

The drainage area contributing to Conklingville Dam (Sacandaga Lake)

is approximately 1,050 square miles. Snyder and Clark coefficients were developed through watershed modeling done by the Corps to define the basic hydrologic working tools, the unit hydrograph. Using hydrometeorological Report No. 33, the PMP index rainfall was determined to be 18.0 inches for a 24 hour duration, 200 square mile basin. The percentages of the index rainfall applied to other durations were interpolated from the plot of drainage area versus percent of 24 hours, 200 square miles. The computed PMF peak flow was 268,000 CFS. After routing the PMF through the impounded storage, the peak flow was reduced to 105,000 CFS. A plot of the PMF inflow and outflow hydrographs is included in the Appendix. Assumptions made concerning the discharge-storage capacity of the dam were:

1. The reservoir pool was assumed to be at elevation 771.0' (spillway crest).

2. It was assumed that the power station and principal inlets were closed in developing a discharge rating. This condition is possible and leads to a slightly conservative analysis.

3. A weir coefficient of 3.8 was assumed accurate for the spillway. A total spillway length of 395' was used, scaling the length from construction drawings.

4. Elevation - Storage data was calculated using U.S.G.S topographic maps.

5. Hydrologic parameters developed by the Corps were assumed correct.

The ability of the Conklingville Dam to discharge the standard project flood (SPF) was also evaluated. The SPF peak flow of 141,000 CFS was routed through the impounded storage and reduced to 48,000 CFS. The SPF outflow is indicative of a pool elevation of 780.9 feet above MSL, 9.9 feet above the spillway crest. The PMF outflow of 105,000 CFS is equivalent to 15.8 feet above the spillway crest.

Summary of Flood Routing
Conklingville Dam

Elevation Top of Dam = 795.0'

Elevation Crest of Spillway = 771.0'

<u>PMF Routing</u>

PMF Peak = 268,000 CFS

PMF After Routing through Reservoir = 105,000 CFS

Elevation of Routed PMF corresponding to 105,000 CFS - 786.8 feet above MSL

Freeboard Remaining = 8.2 feet

Spillway Surcharge = 15.8 feet

SPF Routing

SPF Peak = 141,000 CFS

SPF After Routing through Reservoir = 48,000 CFS

Elevation of routed SPF corresponding to 48,000 CFS = 780.9 feet above MSL

Freeboard Remaining = 14.1 feet

Spillway Surcharge = 9.9 feet

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability:

a. Visual Observations: No distress, settlement, movement or erosion was noted during the inspection. In general the embankment and spillway walls appeared to be in a stable condition.

b. Design and Construction Data: No design data was available on the structure. In addition no soils testing information was available. Some stability calculations were made on a portion of the concrete weir retaining wall.

c. Operating Records: The dam is not operated in a way that would adversely affect the embankment stability.

d. Post-construction Changes: There have been no post construction changes which should affect the stability of the structure.

e. Seismic Stability: Seismic stability computations are not available. The reservoir is located in seismic zone 2. Since Conklingville Dam was constructed using a sluiced puddle core and no information is available on this material or how it was constructed a seismic stability analysis should be conducted.

SECTION 7: ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment:

a. Safety: The Conklingville Dam does not appear to present an immediate danger to life and property.

b. Adequacy of Information: The available information is not adequate to conduct a complete analysis of the structure. No data relative to embankment stability is available.

The information available to complete the hydrologic analysis is adequate.

The validity of available information appears to be good.

c. Urgency: The condition of Conklingville Dam is considered to be a non-emergency situation not requiring immediate action to protect downstream development.

d. Necessity for Future Studies: The hydraulic fill (puddle core) type construction in a moderate seismic zone, and the lack of information on construction, embankment materials and stability analysis dictate that evaluation of the embankment under seismic loading be completed in the future.

7.2 Recommendations:

1. Embankment stability analysis should be conducted.
2. The owner should continue his excellent maintenance and operating program.
3. In the future some surface maintenance to the spillway structure will be necessary.
4. Replacement of rock rip rap at the end principal spillway channel (toe of dam) should be completed to prevent progressive erosion or erosion during peak discharge periods.

APPENDIX A

GEOLOGY

Conklingville Dam and Sacandaga Lake

The bedrock in the vicinity of the Conklingville Dam is of Precambrian age. It is composed mostly of granitic gneiss. The oldest of the geotectoric cycles recognized in this belt is commonly referred to as the Grenville Orogeny. There were a number of sequencies within this orogeny. Most geologists believe that the Adirondack Mountains were formed by the domical uplift of the crustal basement. But to explain the metasedimentary rocks within the region, other geologists believe that the present Adirondacks are due to an isostatic uplift of a very ancient peneplained mountain chain. This is illustrated by the fault blocks or horst and grabens of the southern Adirondacks (See cross-sections).

The Adirondacks are still mildly, seismic. This is due to both isostatic uplifting and glacial rebound. Many faults transverse through the reservoir and are easily exposed by using landsat information.

APPENDIX B

HYDROLOGIC COMPUTATIONS

L. ROBERT KIMBALL
Consulting Engineers

SUBJECT ___ BY ___ DATE ___
SHEET NO. ___ OF ___
JOB NO. ___

SACANDAGA RESERVOIR

PRECIPITATION:

SPILLWAY IS LOCATED AT 73°55'30" LONGITUDE AND 43°19' LATITUDE.

FROM HYDROMETEOROLOGICAL REPORT #33,
PMP = 18"

DEPTH - AREA RELATIONSHIPS
6 HR - 50%

12 HR - 68%

24 HR - 77%

48 HR - 86%

FROM DRAFT EM 1110-2-1411.

SPS = 9"

DEPTH - AREA RELATIONSHIP
24 HR - 82%

9"(.82) = 7.38"

DRAINAGE AREA

AREA = 1050 SQ. MI.

SACANDAGA RESERVOIR

ELEVATION - STORAGE RELATIONSHIP

ELEV. FT.	SURFACE AREA ACRES	Δ ELEV. FT	TOTAL STORAGE AC-FT
771	25,178		0
		1.0	
772	25,381		25,280
		1.0	
773	25,533		50,762
		1.0	
774	25,786		76,446
		1.0	
775	25,989		102,334
		1.0	
776	26,191		128,424
		1.0	
777	26,394		154,716
		1.0	
778	26,597		181,212
		1.0	
779	26,799		207,910
		1.0	
780	27,002		234,810
		1.0	
781	27,122		261,872
		1.0	
782	27,241		289,054
		1.0	
783	27,361		316,354
		1.0	
784	27,480		343,775
		1.0	
785	27,600		371,315
		1.0	
786	27,719		398,974

L. Robert Kimball
Consulting Engineers

SUBJECT ______ BY ______ DATE ______
SHEET NO. ______ OF ______
JOB NO. ______

Sacandaga Reservoir

Elevation - Storage Relationship

Elev Ft	Surface Area Acres	Δ Elev Ft	Total Storage Ac-Ft
		1.0	
787	27,839		426,754
		1.0	
788	27,958		454,652
		1.0	
789	28,078		482,670
		1.0	
790	29,198		510,808
		1.0	
791	28,317		539,066
		1.0	
792	28,437		567,442
		1.0	
793	28,556		595,939
		1.0	
794	28,676		624,555
		1.0	
795	28,795		653,290
		1.0	
796	28,915		682,146
		1.0	
797	29,034		711,120
		1.0	
798	29,154		740,214
		1.0	
799	29,273		769,428
		1.0	
800	29,393		798,760

SACANDAGA RESERVOIR

ELEVATION - DISCHARGE RELATIONSHIP
(IGNORING PRINCIPLE SPILLWAY AND POWERHOUSE FLOW)

	Emergency Spillway		Siphon Spillway		Total Discharge
Elev.	H	Q	H	Q	Q
Ft	Ft	CFS	Ft	CFS	CFS
771	0	0			0
772	1.0	1500			1,500
773	2.0	$\cancel{4245}$	0	0	4,245
774	3.0	7800	1.0	140	7,940
775	4.0	12,010	2.0	390	12,400
776	5.0	16,780	3.0	710	17,490
777	6.0	22,060	4.0	1090	23,150
778	7.0	27,500	5.0	1530	29,330
779	8.0	33,960	6.0	2010	35,970
780	9.0	40,530	7.0	2530	43,060
781	10.0	47,470	8.0	3100	50,570
782	11.0	54,760	9.0	3690	58,450
783	12.0	62,400	10.0	12,320	74,720
784	13.0	70,360	11.0	12,430	82,790
785	14.0	78,630	12.0	12,530	91,160
786	15.0	87,200	13.0	12,640	99,840

L. ROBERT KIMBALL
Consulting Engineers

SUBJECT ______ BY ______ DATE ______
SHEET NO. ______ OF ______
JOB NO. ______

SACANDAGA RESERVOIR

ELEVATION - DISCHARGE RELATIONSHIP

	EMERGENCY SPILLWAY		SIPHON SPILLWAY		OVERTOP	TOTAL
ELEV	H	Q	H	Q	Q	Q
FT	FT	CFS	FT	CFS	CFS	CFS
787	16.0	96,060	14.0	12,740		108,800
788	17.0	105,210	15.0	12,840		118,050
789	18.0	114,630	16.0	12,940		127,570
790	19.0	124,310	17.0	13,040		137,350
791	20.0	134,250	18.0	13,140		147,390
792	21.0	144,450	19.0	13,240		157,690
793	22.0	154,890	20.0	13,340		168,230
794	23.0	165,570	21.0	13,440		179,010
795	24.0	176,480	22.0	13,540	0	190,020
796	25.0	187,630	23.0	13,630	3080	204,340
797	26.0	198,990	24.0	13,730	8710	221,430
798	27.0	210,550	25.0	13,820	16,000	240,400
799	28.0	222,390	26.0	13,920	24,640	260,950
800	29.0	234,410	27.0	14,010	34,440	282,860

L. ROBERT KIMBALL
Consulting Engineers

SUBJECT ____ BY ____ DATE ____
SHEET NO ____ OF ____
JOB NO. ____

SACANDAGA RESERVOIR

ELEVATION - DISCHARGE RELATIONSHIPS

EMERGENCY SPILLWAY:

$$Q = CLH^{3/2}$$

$C = 3.8$
$L = 335'$

SIPHON SPILLWAY

TO ELEV 782'

$$Q = CLH^{3/2}$$

$C = 3.8$
$L = 36'$

AFTER ELEV 782'

$$Q = CBD\sqrt{2gH_T}$$

$C = 0.70$
$B = 36'$
$D = 9'$
$H_T = 43' + H$

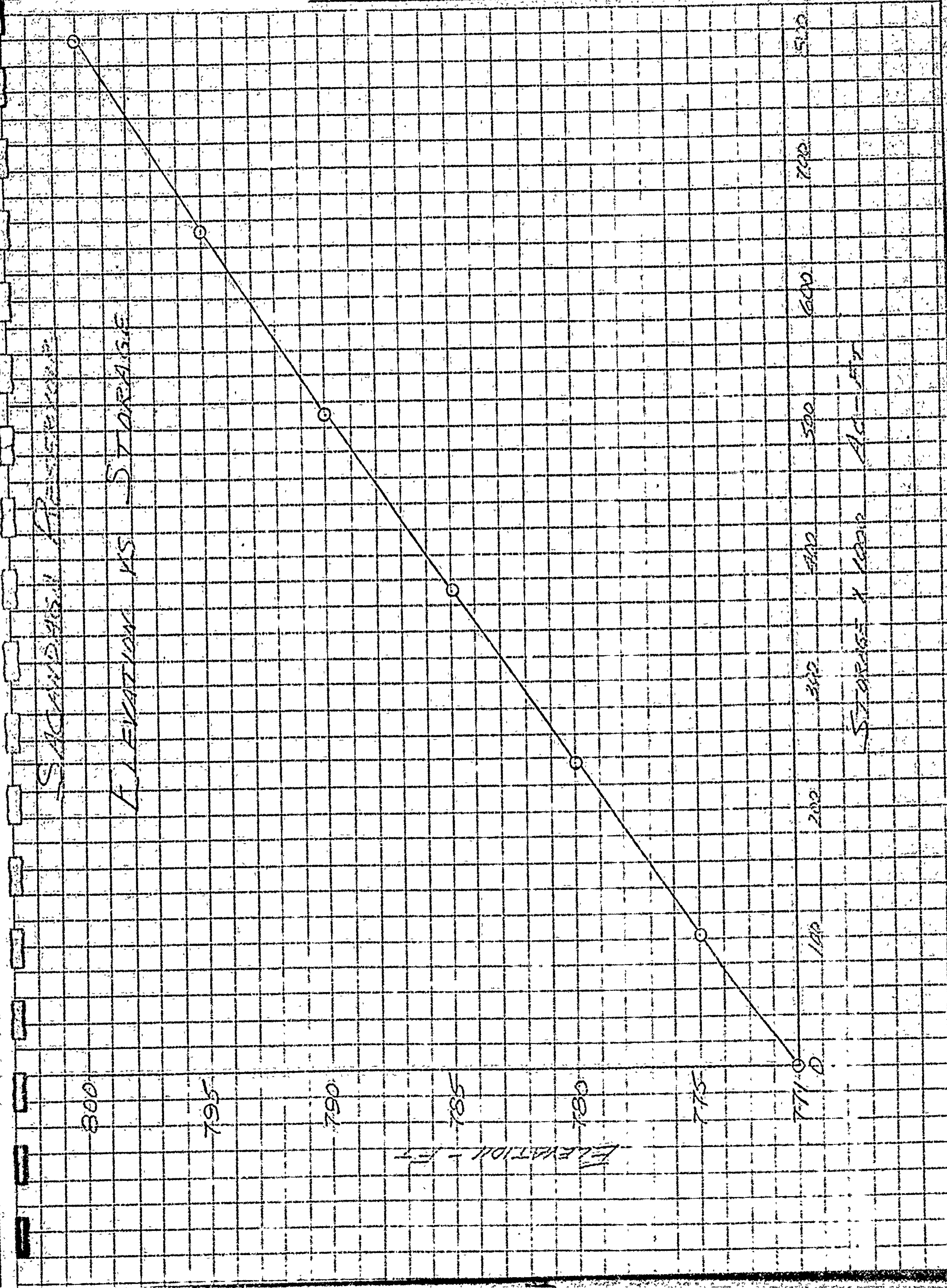
OVERTOP:

$$Q = CLH^{3/2}$$

$C = 2.8$
$L = 1100'$

L. ROBERT KIMBALL
Consulting Engineers

BY ______ DATE ______
SHEET NO. ______ OF ______
JOB NO. ______



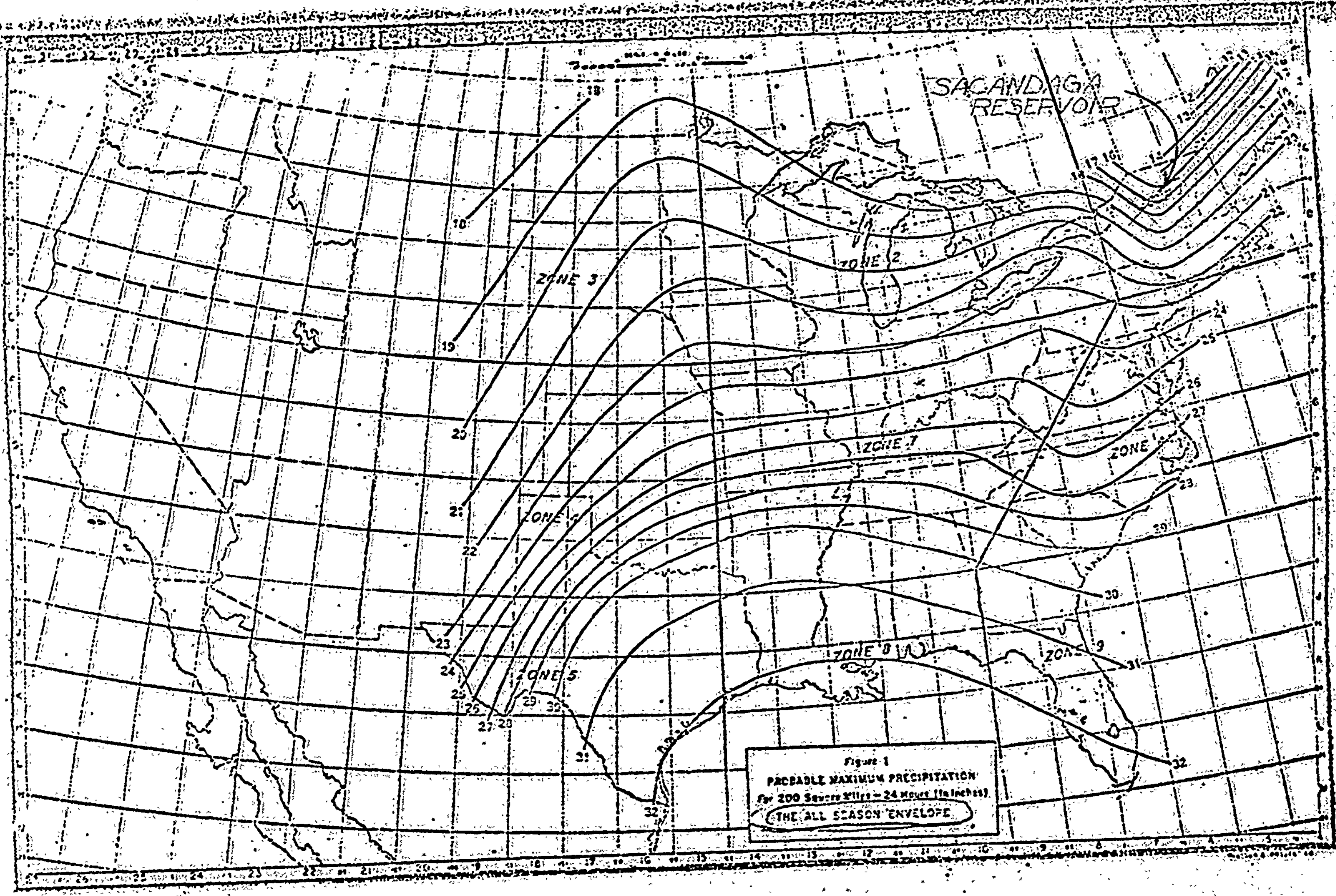
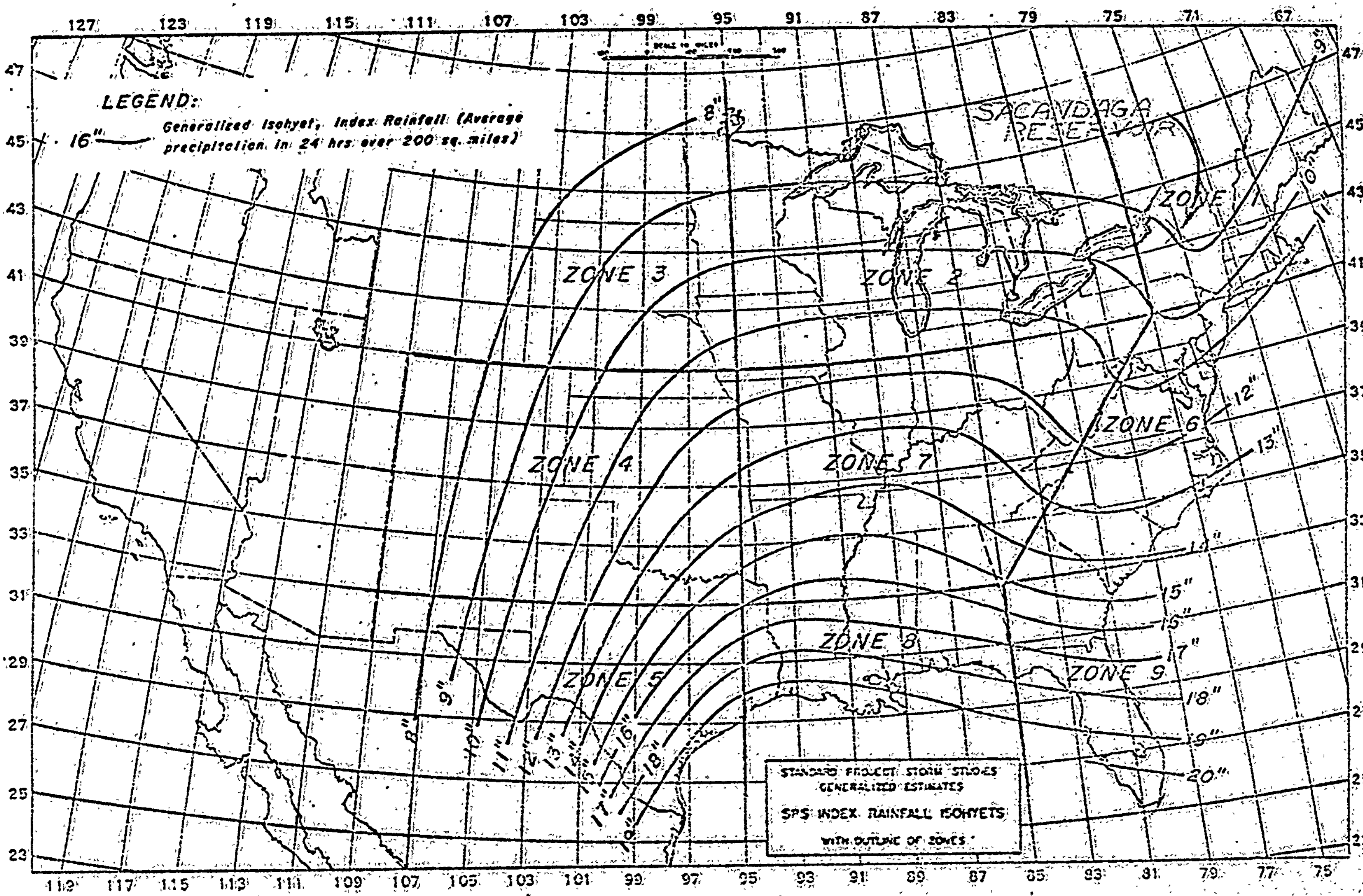
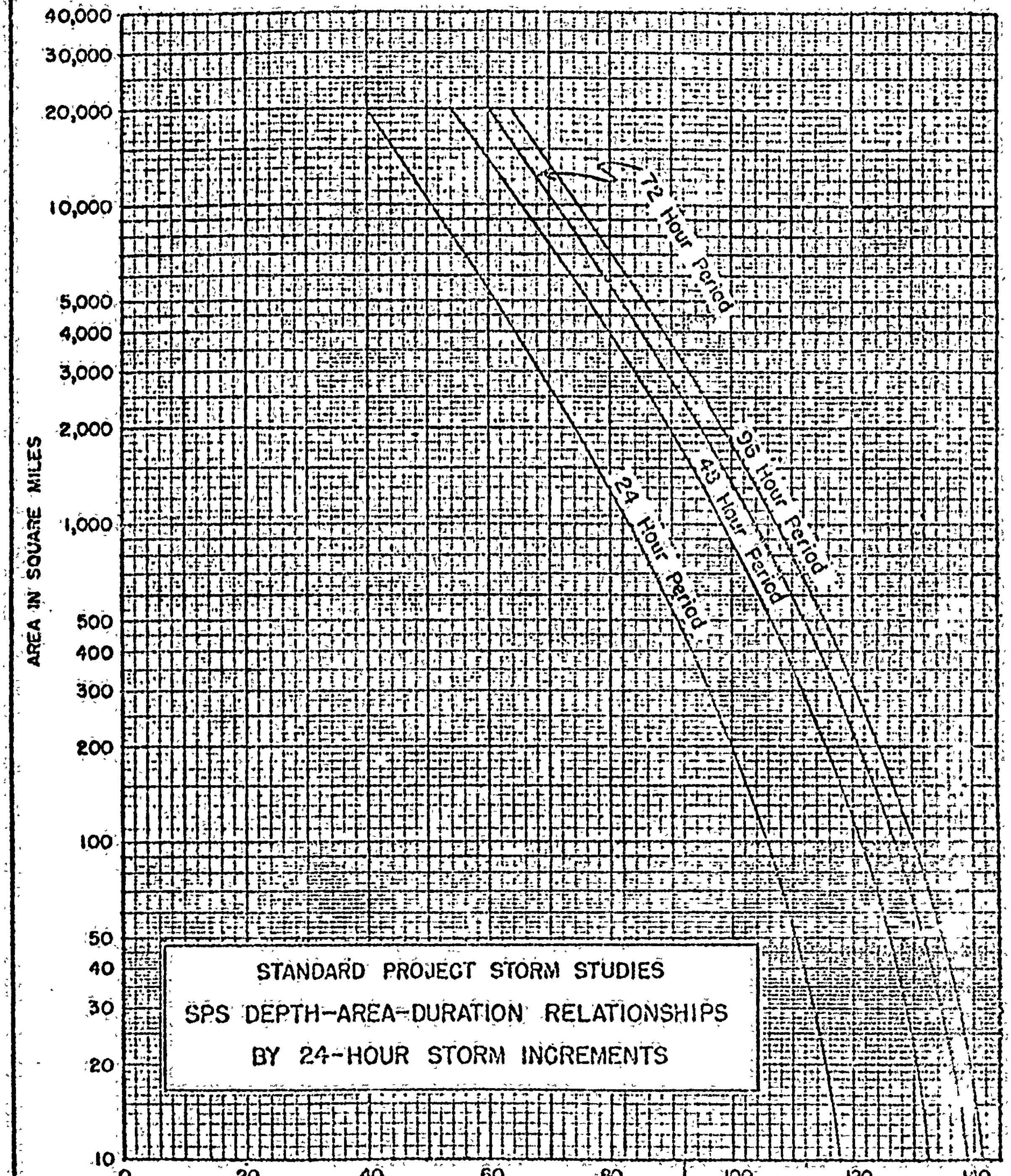


Figure 1
PROBABLE MAXIMUM PRECIPITATION
For 200 Square Miles — 24 Hours (In Inches)
THE ALL SEASON ENVELOPE


LEGEND:
16" Generalized Isohyet, Index Rainfall (Average precipitation in 24 hrs over 200 sq. miles)
SACANDAGA RESERVOIR
ZONE 1
ZONE 2
ZONE 3
ZONE 4
ZONE 5
ZONE 6
ZONE 7
ZONE 8
ZONE 9
STANDARD PROJECT STORM STUDIES
GENERALIZED ESTIMATES
SPS INDEX RAINFALL ISOHYETS
WITH OUTLINE OF ZONES

H-34-7A


40,000
30,000
20,000
10,000
5,000
4,000
3,000
2,000
1,000
500
400
300
200
100
50
40
30
20
10
AREA IN SQUARE MILES
0
20
40
60
80
100
120
140
SPS INDEX RAINFALL RATIO (IN PERCENT)
72 Hour Period
96 Hour Period
48 Hour Period
24 Hour Period
STANDARD PROJECT STORM STUDIES
SPS DEPTH-AREA-DURATION RELATIONSHIPS
BY 24-HOUR STORM INCREMENTS

OCE 10/3/51

6.4 Upper Hudson Basin to Confluence with Sacandaga River

The Upper Hudson River to the Sacandaga River confluence drains an area of 2722 square miles. This area is sparsely populated; the only city in the area is Warrensburg. Major tributaries to the Hudson include Cedar River, Indian River, Schroon River and Sacandaga River. Two reservoirs, Indian Lake and Great Sacandaga Lake, lie in the basin also. Numerous natural lakes dot the area, the largest being Schroon and Brant Lakes, both in the Schroon River Subbasin.

The Upper Hudson Basin was divided into 15 subbasins (Figure 6.16) and connected as shown in the schematic in Figure 6.17. Gauges on the main stem of the Hudson are at Newcomb, Gooley, North Creek and Hadley, and tributary gauges include the Cedar River below Chain Lakes, the East Branch of the Sacandaga River at Griffin, the Schroon River at Riverbank, and the Sacandaga River near Hope. The remaining two gauges lie just below the outlets of the two reservoirs.

Tables 6.20 through 6.22 present the subbasin characteristics while Table 6.23 presents the routing parameters. Tables 6.24 and 6.25 give the data for Indian Lake and Great Sacandaga Lake.

Tables 6.26 and 6.28 present the results of the simulation runs. Figures 6.18 through 6.29 show the comparisons of computed and observed hydrographs for the two historic events. Lastly, Table 6.29 shows the SPF hydrographs at key locations in the basin.

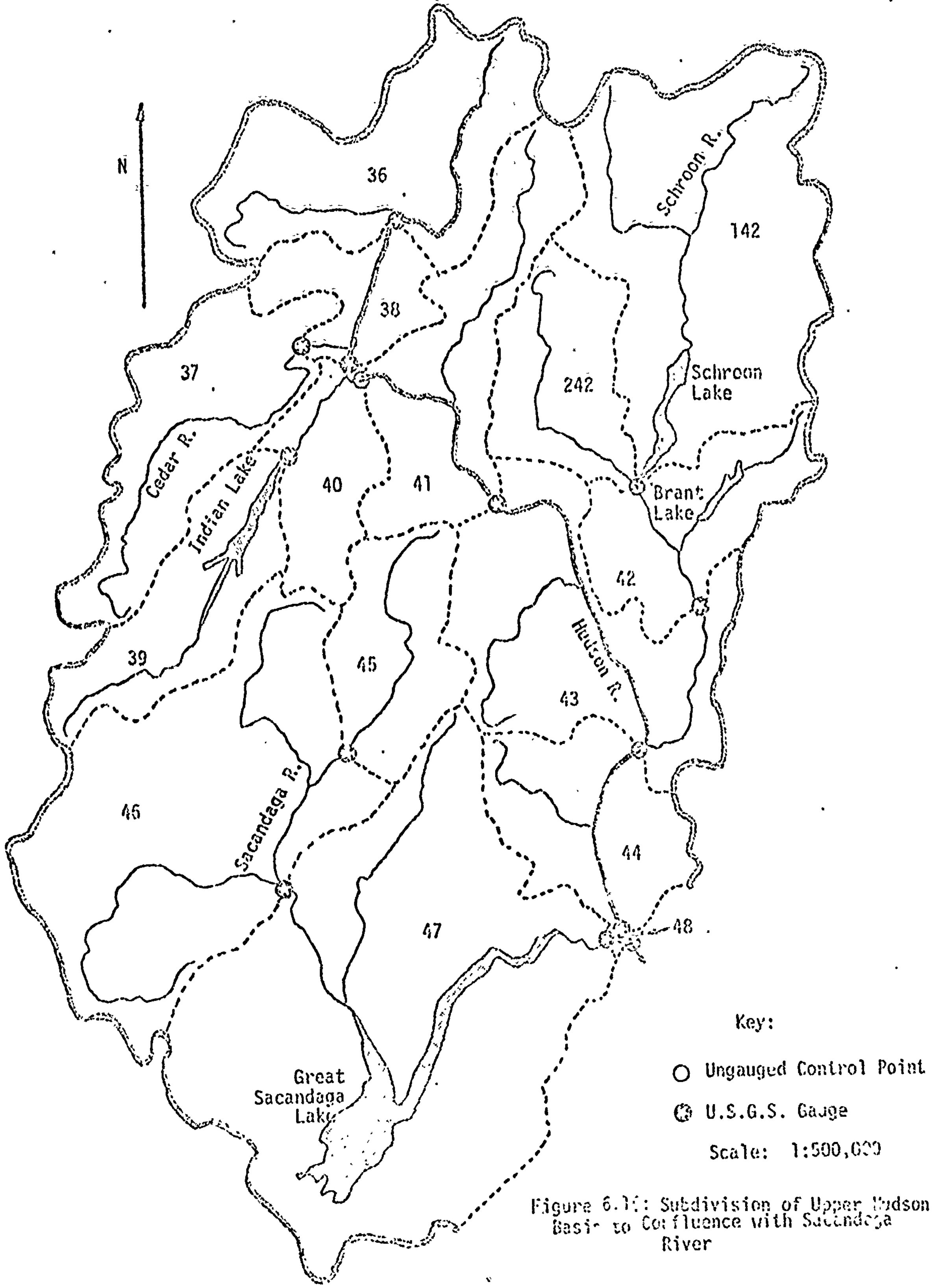


Figure 6.1?: Subdivision of Upper Hudson Basin to Confluence with Sacandaga River

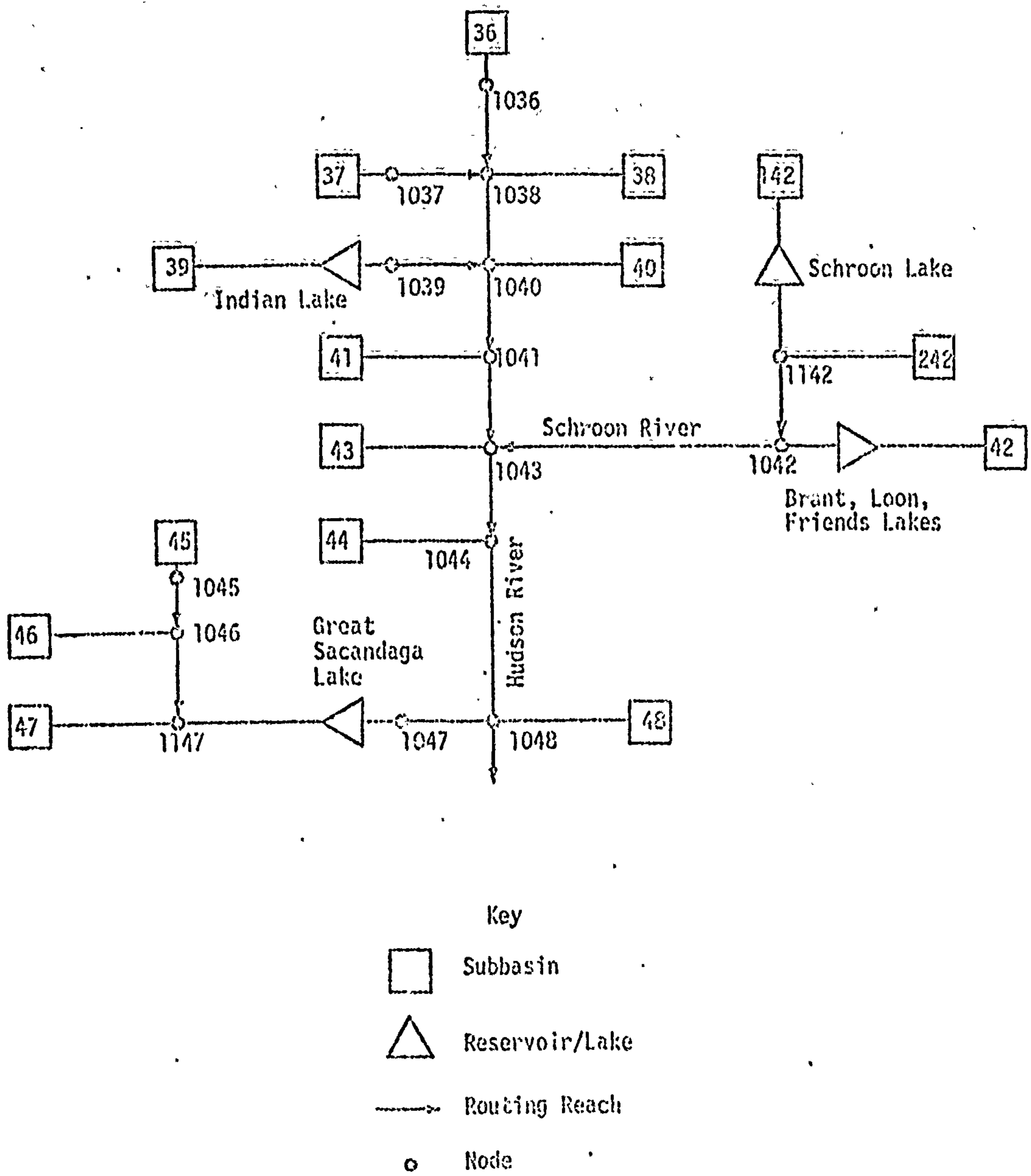


Figure 6.17

Schematic of Hudson Basin to Confluence With Sacandaga River

The observed and computed hydrographs for this basin showed good agreement except for the shape of the hydrographs for the 1948 event at Riverbank on the Schroon River (Figure 6.22) and the 1972 event at Newcomb on the Hudson River (Figure 6.26). The response of the Schroon Basin appears to be damped significantly by natural lake storage. However, in view of the lack of detailed data on this basin it was impossible to determine a better structure to model this basin. The response of the Hudson River above Newcomb is quite different for the 1948 and 1972 events (Figures 6.18 and 6.26). Attempts to find unit hydrograph parameters that would accurately reproduce both events proved unsuccessful.

The effect of Schroon, Brant, Loon, and Friends Lakes is to delay and attenuate the runoff from the Schroon Basin. This is apparent from the SPF and Transposed Agnes events as well as a review of the historic record at Riverbank, USGS Gauge 3170 which shows much lower peak discharges/area ratios than the rest of the Upper Hudson Basin. Sacandaga Reservoir also has a major effect on the runoff from the Sacandaga River Basin, significantly reducing the peak flows even though the initial stage was at the spillway elevation.

The Transposed Agnes event had higher discharges than the SPF event in the Upper Hudson Basin except for the upper Sacandaga River Basin. A comparison of the SPF and Transposed Agnes results versus maximum recorded peaks for the entire Upper Hudson Basin is presented in Section 6.6.

Table 6.21
UPPER HUDSON BASIN TO CONFLUENCE WITH SACANDAGA RIVER
SUBBASIN 3-HOUR UNIT HYDROGRAPHS

Time (hrs)	36	37	38	39	40	41	242	142	42	43	44	45
3	214	200	163	417	149	360	296	370	441	536	392	313
6	793	738	597	1488	548	1306	1063	1360	1564	1925	1397	1129
9	1591	1479	1156	2834	1074	2548	2034	2701	2921	3715	2648	2175
12	2460	2260	1610	3921	1526	3730	2813	4180	3902	5410	3632	3056
15	3187	2874	1768	4332	1734	4476	3093	5494	4072	6470	3956	3445
18	3608	3179	1605	3878	1632	4580	2757	6338	3378	6611	3470	3178
21	3627	3079	1322	2969	1381	4000	2141	6623	2416	5720	2608	2535
24	3292	2718	1089	2203	1164	3173	1644	6191	1725	4396	1919	1962
27	2872	2359	898	1535	982	2516	1263	5313	1232	3347	1412	1518
30	2506	2048	739	1213	828	1996	970	4484	879	2548	1039	1175
33	2186	1777	609	900	699	1583	745	3784	628	1940	765	909
36	1907	1543	502	668	589	1255	572	3193	448	1477	563	704
39	1664	1339	413	496	497	996	439	2695	320	1124	414	545
42	1451	1162	341	368	419	790	337	2274	229	856	305	422
45	1266	1009	281	273	354	626	259	1919	163	652	224	326
48	1105	876	231	203	298	497	199	1620	117	496	165	253
51	964	760	190	150	251	394	153	1367	83	378	121	195
54	841	660	157	112	212	312	117	1153	59	288	89	151
57	733	573	129	83	179	248	90	973	42	219	66	117
60	640	497	106	61	151	197	69	821		167	48	91
63	558	432	88	45	127	156	53	693		127	36	70
66	487	375	72		107	124	41	585		97		54
69	425	325	60		91	98	31	494		74		42
72	371	282	49		76	78		417				32
75	323	245	40		64	62		352				
78	282	213	33		54	49		297				
81	246	185	27		46	39		250				
84	215	160	23		39			211				
87	187	139	19		33			178				
90	163	121	15		27			151				
93	143	105			23			127				
96	124	91			20			107				
99	108	79			16			90				
102	95	69			14			76				
105	83	59						64				
108	72	52						54				
111	63	45										
114	55	39										
117	48	34										
120	42	29										
123	36	25										
126	32											
129	28											

All flows in cfs/unit rainfall

Table 6.21
UPPER HUDSON BASIN TO CONFLUENCE WITH SACANDAGA RIVER
SUBBASIN 3-HOUR UNIT HYDROGRAPHS

Time (hrs)	36	37	38	39	40	41	242	142	42	43	44	45
3	214	200	163	417	149	360	296	370	441	536	392	313
6	793	738	597	1488	548	1306	1063	1360	1564	1925	1397	1129
9	1591	1479	1156	2834	1074	2548	2034	2701	2921	3715	2648	2175
12	2460	2260	1610	3921	1526	3730	2813	4180	3902	5410	3632	3056
15	3187	2874	1768	4332	1734	4476	3093	5494	4072	6470	3956	3445
18	3608	3179	1605	3878	1632	4580	2757	6338	3378	6611	3470	3178
21	3627	3079	1322	2969	1381	4000	2141	6623	2416	5720	2608	2535
24	3292	2718	1089	2203	1164	3173	1644	6191	1725	4396	1919	1962
27	2872	2359	898	1535	982	2516	1263	5313	1232	3347	1412	1518
30	2506	2048	739	1213	828	1996	970	4484	879	2548	1039	1175
33	2186	1777	609	900	699	1583	745	3784	628	1940	765	909
36	1907	1543	502	668	589	1255	572	3193	448	1477	563	704
39	1664	1339	413	496	497	996	439	2695	320	1124	414	545
42	1451	1162	341	368	419	790	337	2274	229	856	305	422
45	1266	1009	281	273	354	626	259	1919	163	652	224	326
48	1105	876	231	203	298	497	199	1620	117	496	165	253
51	964	760	190	150	251	394	153	1367	83	378	121	195
54	841	660	157	112	212	312	117	1153	59	288	89	151
57	733	573	129	83	179	248	90	973	42	219	66	117
60	640	497	106	61	151	197	69	821		167	48	91
63	558	432	88	45	127	156	53	693		127	36	70
66	487	375	72		107	124	41	585		97		54
69	425	325	60		91	98	31	494		74		42
72	371	282	49		76	78		417				32
75	323	245	40		64	62		352				
78	282	213	33		54	49		297				
81	246	185	27		46	39		250				
84	215	160	23		39			211				
87	187	139	19		33			178				
90	163	121	15		27			151				
93	143	105			23			127				
96	124	91			20			107				
99	108	79			16			90				
102	95	69			14			76				
105	83	59						64				
108	72	52						54				
111	63	45										
114	55	39										
117	48	34										
120	42	29										
123	36	25										
126	32											
129	28											

All flows in cfs/unit rainfall

Table 6.21 (Cont'd)

Time (hrs)	46	47	48
3	268	693	99
6	998	2527	223
9	2016	4970	179
12	3185	7638	80
15	4358	10129	36
18	5304	11876	16
21	5893	12631	7
24	6078	12328	3
27	5742	10799	
30	5132	8811	
33	4574	7183	
36	4077	5855	
39	3634	4773	
42	3239	3891	
45	2887	3171	
48	2573	2585	
51	2293	2107	
54	2044	1718	
57	1822	1400	
60	1624	1141	
63	1447	930	
66	1290	758	
69	1150	618	
72	1025	504	
75	913	411	
78	814	335	
81	726	273	
84	647	223	
87	576	181	
90	514	148	
93	458	121	
96	408		
99	364		
102	324		
105	289		
108	258		
111	230		
114	205		
117	182		
120	163		
123	145		

All flows in cfs/unit rainfall

TABLE 6.22
UPPER HUDSON RIVER TO CONFLUENCE WITH SACANDAGA RIVER
INITIAL FLOW AND INFILTRATION PARAMETERS

Subbasin No.	December, 1948			June, 1972			SPS and Transposed Agnes		
	Initial Flow (cfs)	Initial Loss (in)	Constant Loss (in/hr)	Initial Flow (cfs)	Initial Loss (in)	Constant Loss (in/hr)	Initial Flow (cfs)	Initial Loss (in)	Constant Loss (in/hr)
36	102	.50	.03	755	.20	.07	340	1.0	.075
37	123	.50	.03	270	.10	.06	270	1.0	.075
38	35	.50	.04	95	.20	.06	95	1.0	.075
39	75	1.00	.03	240	.10	.06	240	1.0	.075
40	35	.50	.03	110	.10	.06	110	1.0	.075
41	100	.50	.03	290	.20	.15	290	1.0	.075
242	54	2.50	.05	152	1.00	.15	152	2.0	.075
142	220	2.50	.04	600	.50	.10	600	2.0	.075
42	65	2.50	.05	180	1.00	.10	180	2.0	.075
43	150	1.00	.07	400	.20	.15	400	1.0	.075
44	70	1.00	.07	185	.20	.12	185	1.0	.075
45	50	1.00	.02	180	.10	.035	180	1.0	.075
46	280	.80	.02	745	1.30	.04	745	1.0	.075
47	445	.80	.04	1200	.80	.04	1200	1.0	.075
48	3	1.00	.05	5	.50	.06	5	1.0	.075

Table 6.23

UPPER HUDSON RIVER TO CONFLUENCE WITH SACANDAGA RIVER
ROUTING REACH CHARACTERISTICS

Reach No.	Length (mi)	Slope (ft/mi)	Muskingum Parameters NSTEPS	K (hrs.)	X (-)
1036-1038	10.2	10.6	3	1.3	.3
1037-1038	4.0	25.5	1	1.0	.3
1038-1040	**	DUMMY LINK		**	
1039-1040	6.6	27.1	1	1.6	.3
1040-1041	17.0	25.3	2	2.1	.2
1041-1043	21.4	18.2	3	2.1	.2
1142-1042	11.1	9.6	3	1.5	.1
1042-1043	16.3	6.1	5	1.6	.3
1043-1044	13.5	3.0	6	1.6	.2
1044-1048	**	DUMMY LINK		**	
1045-1046	11.5	31.8	2	1.3	.3
1046-1147	8.5	13.0	2	1.5	.3
1147-1047	Great Sacandaga Lake (reservoir routing)				
1047-1048	**	DUMMY LINK		**	

Table 6.24

INDIAN LAKE

Storage-Discharge Relationship

Elevation (ft. above MSL)	Storage (acre-ft)	Discharge (cfs)
1651.3	106560	0
1653	114350	700
1654	118250	1440
1655	123060	2340
1656	128100	3370
1657	134060	4525
1658	138460	5785
1661.3	153045	10000

	Initial Storage Level (acre-ft)
December 1948	(not simulated)
June 1972	(not simulated)
SPF and Transposed Agnes	106560

Table 6.25

GREAT SACANDAGA LAKE

Storage-Discharge Relationship

Elevation (ft. above MSL)	Storage (acre-ft)	Discharge (cfs)
745	267208	6358
749.3	352375	6680
758	435941	7275
767	655418	7848
769	707300	7970
770	733700	8029
771.2	765610	8220
773	814279	11971
774	841598	23187
778	941230	41164
781.1	1017912	55000

Initial Storage Level (acre-ft)

December 1948	(not simulated)
June 1972	733700
SPF and Transposed Agnes	760302

Table 6.26

UPPER HUDSON BASIN TO CONFLUENCE WITH SACANDAGA RIVER
SUBBASIN RAINFALL AND PEAK FLOWS

Subbasin	December, 1948 Rainfall (in) Total	Excess	Peak Flow (cfs)	June, 1972 Rainfall (in) Total	Excess	Peak Flow (cfs)	SPF Rainfall (in) Total	Peak Flow (cfs)	Transposed Agnes Rainfall (in) Total	Excess	Peak Flow (cfs)
36	4.78	2.59	7157	3.22	1.10	2825	11.8	29883	13.1	10.3	32082
37	5.44	3.23	6663	2.80	1.02	2367	12.0	26307	12.6	9.3	22979
38	4.91	2.31	2561	3.29	1.49	1806	12.6	15374	13.5	10.2	12315
39	5.02	2.62	5784	3.72	1.57	3191	12.1	35527	12.1	9.0	26033
40	5.60	3.40	3646	2.53	1.04	1307	12.6	15101	13.5	10.2	12451
41	5.60	3.36	9576	3.13	0.81	2921	11.9	37255	14.0	10.5	36588
242	4.98	1.38	3399	3.08	0.83	2178	12.4	25716	14.4	10.5	23460
142	4.83	1.39	8302	2.84	0.59	2106	11.3	50223	11.6	7.9	43826
42	5.70	1.81	4925	3.00	0.30	1585	12.2	33554	12.7	8.9	25830
43	7.36	2.98	12679	3.35	0.42	2463	11.7	52056	13.9	10.7	51898
44	7.50	3.18	7662	3.58	1.02	2298	12.2	32535	14.6	11.5	30357
45	7.14	5.02	9153	3.55	1.85	3128	12.2	28632	14.5	11.4	27056
46	5.51	3.76	14561	4.99	2.55	8530	11.2	46498	11.4	6.9	30092
47	6.83	4.11	32431	4.10	2.16	12858	10.8	93128	12.0	9.2	93639
48	7.50	4.03	434	3.98	2.25	220	13.6	2102	14.8	11.6	1252

Table 6.27

UPPER HUDSON RIBER TO CONFLUENCE WITH SACANDAGA RIVER
SIMULATED PEAK FLOWS AT CONTROL POINTS
(All Flows in cfs)

Control Point	Description	December 1948	June 1972	SPF	Transposed Agnes	Drainage Area (mi^2)
1036	Hudson R. at Newcomb USGS 3120	7157	2825	29883	32082	192
1037	Cedar R. below Chain Lakes USGS 3135	6663	2367	26307	22979	160
1038	Hudson R. at Gooley USGS 3140	15922	6524	59916	65224	419
1039	Indian R. below Indian Lake Dam USGS 3150	453R	1884R	9272	8983	132
1040	Hudson R. below Indian R.	19480	9489	72803	83664	623
1041	Hudson R. at North Creek USGS 3155	27562	11867	93217	110792	792
1142	Schroon R. below Trout Br.	5023	2926	27807	30284	412
1042	Schroon R. at Riverbank USGS 3170	6592'	3187	33426	38480	527
1043	Hudson R. below Schroon R.	40768	16503	129779	173149	1546
1044	Hudson R. at Hadley USGS 3185	42256	17131	128420	175978	1664
1045	E. Br. Sacandaga R. at Griffin USGS 3190	9153	3128	28632	27056	114
1046	Sacandaga R. near Hope USGS 3210	23504	10220	66646	48928	491
1147	Total Inflow Into Sacandaga Reservoir	55543	23026	146398	139307	1055
1047	Sacandaga R. below Conklingville Dam, USGS 3250	5130R	9353	44739	52441	1055
1043	Hudson R. below Sacandaga R.	42344	26209	154540	225877	2722

R = Assumed Regulated Discharge

Table 6.28

UPPER HUDSON BASIN TO CONFLUENCE WITH SACANDAGA RIVER
COMPARISONS OF OBSERVED VS COMPUTED HYDROGRAPHS*

Gauge No. RAI	Gauge No. USGS	Gauge Name		December 1948 Peak (cfs)	December 1948 Volume (acre-ft)	December 1948 Timing (hrs)	June 1972 Peak (cfs)	June 1972 Volume (acre-ft)	June 1972 Timing (hrs)
1035	3120	Hudson R. near Newcomb	Computed	7157	27857	31/23	2825	14757	24/10
			Observed	7430	31884	32/8	2279	21252	25/10
			Difference	-3.7%	-12.6%	-9	+24.0%	-30.6%	-24
1037	3135	Cedar River below Chain Lakes	Computed	6663	28450	31/23	(Gauge not active)		
			Observed	7360	28904	31/23			
			Difference	-9.5%	-1.6%	0			
1038	3140	Hudson R. at Gooley	Computed	15922	65099	32/1	(Gauge not active)		
			Observed	15000	71066	32/6			
			Difference	+6.1%	-8.4%	-5			
1041	3155	Hudson R. at North Creek	Computed	27562	113994	32/1	(Gauge not active)		
			Observed	28900	128482	31/20			
			Difference	-4.6%	-11.3%	+5			
1042	3170	Schroon R. at Riverbank	Computed	6592	37562	32/4	(Gauge not active)		
			Observed	6780	44041	33/9			
			Difference	-2.8%	-14.7%	-29			
1044	3185	Hudson R. at Hadley	Computed	42256	205869	32/13	17131	102861	25/2
			Observed	42700	226051	32/2	14805	121016	25/0
			Difference	-1.0%	-8.9%	+11	+15.7%	-15.0%	+2
1045	3190	E. Br. Sacandaga R. at Griffin	Computed	9153	32315	31/20	3128	13786	24/5
			Observed	10700	31240	31/16	3140	17966	24/12
			Difference	-14.5%	+3.4%	+4	-0.4%	-23.3%	-7
1046	3210	Sacandaga R. near Hope	Computer	23504	107586	32/0	10220	67401	24/9
			Observed	31100	105335	31/17	11400	78705	24/4
			Difference	-24.4%	+2.1%	+7	-10.4%	-14.4%	+5

*Gauges immediately below reservoirs not included.

Table 6.29

SPF HYDROGRAPHS FOR UPPER HUDSON BASIN TO CONFLUENCE WITH SACANDAGA RIVER
AT CONTROL POINT 1038 HUDSON R. AT GOOLEY, USGS 3140

687.	683.	675.	665.	653.	638.	623.	607.	592.	576.
562.	547.	533.	519.	506.	493.	480.	467.	455.	443.
432.	421.	410.	399.	389.	379.	369.	359.	350.	341.
332.	324.	315.	307.	299.	291.	284.	277.	272.	284.
329.	415.	540.	703.	900.	1126.	1374.	1635.	1898.	2158.
2407.	2636.	2840.	3009.	3145.	3260.	3363.	3457.	3562.	3676.
3833.	4108.	4592.	5449.	6874.	8953.	11683.	15016.	18866.	23126.
27663.	32324.	36959.	41442.	45635.	49408.	52664.	55315.	57322.	58732.
59593.	59916.	59697.	58932.	57698.	56102.	51220.	52139.	49954.	47750.
45587.	43500.	41502.	39598.	37786.	36062.	34421.	32860.	31372.	29955.
28602.	27309.	26071.	24886.	23758.	22678.	21643.	20652.	19702.	18793.
17924.	17092.	16298.	15540.	14817.	14128.	13471.	12845.	12249.	11680.
11138.	10622.	10133.	9679.	9246.	8833.	8442.	8075.	7723.	7388.
7067.	6760.	6469.	6203.	5958.	5725.	5505.	5304.	5125.	4964.
4813.	4668.	4532.	4406.	4288.	4176.	4067.	3961.	3858.	3758.

AT CONTROL POINT 1041 HUDSON R. AT NORTH CREEK, USGS 3155

1078.	1071.	1063.	1055.	1044.	1032.	1017.	1000.	982.	962.
942.	921.	900.	879.	858.	838.	818.	798.	779.	761.
743.	725.	708.	691.	675.	659.	644.	629.	614.	600.
587.	573.	560.	548.	535.	523.	511.	500.	492.	506.
560.	652.	780.	947.	1156.	1407.	1699.	2028.	2385.	2752.
3116.	3466.	3794.	4092.	4356.	4586.	4777.	4926.	5057.	5201.
5418.	5801.	6452.	7596.	9424.	11973.	15262.	19296.	24084.	29600.
35766.	42446.	49439.	56504.	63412.	69976.	76026.	81391.	85887.	89365.
91727.	92941.	93217.	92842.	91965.	90660.	88946.	86868.	84475.	81826.
78986.	76026.	73012.	70003.	67042.	64161.	61379.	58706.	56144.	53694.
51355.	49121.	46988.	44951.	43001.	41131.	39342.	37635.	36004.	34447.
32959.	31537.	30179.	28883.	27645.	26534.	25500.	24510.	23560.	22671.
21813.	20991.	20203.	19449.	18728.	18043.	17390.	16769.	16181.	15628.
15107.	14614.	14166.	13701.	13277.	12875.	12497.	12141.	11804.	11487.
11190.	10912.	10651.	10404.	10170.	9945.	9730.	9522.	9321.	9126.

Table 6.29 (Cont'd)

AT CONTROL POINT 1044 HUDSON R. AT HADLEY, USGS 3185

2556.	2551.	2547.	2542.	2538.	2533.	2529.	2523.	2517.	2509.
2500.	2489.	2477.	2464.	2450.	2434.	2418.	2399.	2379.	2357.
2334.	2309.	2282.	2254.	2224.	2193.	2161.	2129.	2096.	2063.
2029.	1996.	1963.	1931.	1898.	1867.	1835.	1804.	1775.	1767.
1794.	1847.	1917.	1997.	2086.	2185.	2296.	2415.	2537.	2659.
2784.	2911.	3042.	3174.	3316.	3462.	3671.	3878.	4102.	4375.
4761.	5308.	6091.	7288.	9015.	11194.	13704.	16443.	19360.	22434.
25654.	28984.	32364.	35768.	39203.	42665.	46141.	49634.	53141.	56727.
60601.	64929.	69745.	74999.	80584.	86377.	92235.	98010.	103556.	108738.
113448.	117600.	121132.	123997.	126166.	127622.	128366.	128420.	127819.	126616.
124866.	122659.	120055.	117131.	113970.	110661.	107236.	103772.	100338.	96919.
93545.	90241.	87025.	83911.	80909.	78027.	75270.	72642.	70143.	67772.
65521.	63383.	61349.	59411.	57562.	55799.	54116.	52511.	50980.	49520.
48128.	46800.	45532.	44320.	43160.	42049.	40981.	39956.	38969.	38018.
37103.	36220.	35370.	34550.	33760.	32999.	32265.	31558.	30877.	30220.

AT CONTROL POINT 1047 SACANDAGA R. BELOW CONKLINGVILLE DAM, USGS 3250

8185.	8182.	8179.	8176.	8173.	8170.	8167.	8164.	8160.	8157.
8154.	8151.	8148.	8144.	8141.	8138.	8134.	8131.	8128.	8125.
8121.	8118.	8114.	8111.	8108.	8104.	8101.	8098.	8094.	8091.
8087.	8084.	8081.	8077.	8074.	8070.	8067.	8063.	8060.	8057.
8053.	8050.	8047.	8043.	8041.	8038.	8035.	8033.	8031.	8029.
8028.	8028.	8028.	8027.	8027.	8027.	8027.	8027.	8027.	8027.
8027.	8026.	8028.	8029.	8033.	8038.	8045.	8055.	8069.	8087.
8109.	8135.	8166.	8202.	8548.	9124.	9757.	10454.	11197.	12279.
16426.	20583.	23624.	25494.	27344.	29138.	30836.	32407.	33673.	35227.
36467.	37595.	38617.	39536.	40360.	41093.	41743.	42314.	42812.	43243.
43610.	43919.	44173.	44375.	44530.	44641.	44709.	44739.	44733.	44693.
44622.	44520.	44392.	44237.	44059.	43858.	43637.	43398.	43142.	42870.
42585.	42288.	41979.	41662.	41339.	41011.	40679.	40343.	40003.	39660.
39314.	38965.	38614.	38260.	37905.	37549.	37191.	36832.	36472.	36111.
35751.	35389.	35027.	34666.	34305.	33945.	33586.	33229.	32874.	32520.

Table 6.29 (Cont'd)

AT CONTROL POINT 1048 HUDSON R. BELOW SACANDAGA R.

10746.	10738.	10730.	10723.	10715.	10708.	10700.	10691.	10681.	10670.
10658.	10644.	10628.	10612.	10594.	10576.	10555.	10533.	10510.	10[illegible]5.
10458.	10429.	10399.	10367.	10334.	10300.	10264.	10229.	10192.	10156.
10119.	10082.	10046.	10010.	9974.	9939.	9904.	9869.	9837.	9826.
9854.	9907.	9972.	10040.	10105.	10170.	10244.	10328.	10417.	10507.
10602.	10700.	10801.	10904.	11018.	11155.	11315.	11494.	11689.	11929.
12273.	12793.	13576.	14825.	16656.	18935.	21465.	24080.	26711.	29378.
32154.	35055.	38044.	41095.	44324.	47692.	51142.	54915.	58748.	62811.
68359.	74339.	80362.	87725.	95608.	103566.	111110.	117805.	124205.	130173.
135607.	140428.	144582.	148031.	150753.	152739.	153993.	154540.	154417.	153677.
152376.	150597.	148404.	145870.	143081.	140145.	137062.	133899.	130712.	127511.
124327.	121184.	118100.	115093.	112174.	109354.	106640.	104033.	101533.	99138.
96842.	94639.	92523.	90490.	88536.	86657.	84850.	83112.	81440.	79830.
78280.	76784.	75341.	73945.	72594.	71284.	70013.	68778.	67577.	66410.
65273.	64167.	63089.	62040.	61019.	60025.	59057.	58115.	57198.	56305.

VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01

SACANDAGA RESERVOIR - NEW YORK
RESERVOIR AT TOP OF FLOOD CONTROL POOL
TEST PMP

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
45	0	0	0	0	0	0	2	0	0

JOPER	NWT
5	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

SUBAREA 45

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	[illegible]	[illegible]	0.0	1055.00	0.0	0.0	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	18.00	53.00	98.50	106.50	112.30	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.912

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.07	0.0	0.0

UNIT HYDROGRAPH DATA

TC 16.20 R 11.60 NTA 0

RECESSION DATA

STRTQ 180.00 QRCSN 1350.00 RTIOR 1.30

UNIT HYDROGRAPH 24 END-OF-PERIOD ORDINATES, LAG 13.90 HOURS, CP 0.65 VOL 1.00

312.	1122.	2184.	3045.	3455.	3177.	2559.	1966.	1523.	1179.
913.	707.	548.	424.	329.	254.	197.	153.	118.	92.
71.	55.	43.	33.						

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INCHES		4.08	11.90	15.66	16.22
AC-FT		24335.	72352.	95225.	[illegible]

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INCHES		4.08	11.90	15.66	16.22
AC-FT		24335.	72352.	95225.	[illegible]

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NOVE.

                                    STATION  1

                 INFLOW I , OUTFLOW O , AND OBSERVED FLOW *
    0.    10000.   20000.   30000.   40000.   50000.      0.      0.      0.      0.      8.      0.
 * XXXX 0.
                                                                          PRECIP L AND EXC
LSS X
    0.        0.       0.       0.       0.       0.      0.      0.      0.     12.      8.      4.
LSS X X0.
    1 I      .        .        .        .        .       .       .       .       .       .       .
LSS X X0.L
    2 I      .        .        .        .        .       .       .       .       .       .       .
LSS X X0.L
    3 I      .        .        .        .        .       .       .       .       .       .       .
LSS X X0.L
    4 I      .        .        .        .        .       .       .       .       .       .       .
LSS X X0.L
    5 I      .        .        .        .        .       .       .       .       .       .       .
LSS X X0LX
    6 I      .        .        .        .        .       .       .       .       .       .       .
LSS X X0LX
    7 I      .        .        .        .        .       .       .       .       .       .       .
LSS X X0LL
    8 I      .        .        .        .        .       .       .       .       .       .       .
LSS X X0LL
    9 I      .        .        .        .        .       .       .       .       .       .       .
LSS X X0LX
   10 I      .        .        .        .        .       .       .       .       .       .       .
ESS X X0LX
   11 .I     .        .        .        .        .       .       .       .       .       .       .
LSS X LXXX
   12 .  I   .        .        .        .        .       .       .       .       .       .       .
LSS X LXXX
   13 .    I .        .        .        .        .       .       .       .       .       .      LX
XXXXXXXXXX
   14 .      . I      .        .        .        .       .       .       .       .  LXXXXXXXXXXXXX
XXXXXXXXXX
   15 .      .        .   I    .        .        .       .       .       .       .       .       .
XXXXXXXXLX
   16 .      .        .        .       I.        .       .       .       .       .       .       .
XXXXXXXXLX
   17 .      .        .        .        .      I.       .       .       .       .       .       .
XXXXXXXXLL
   18 .      .        .        .        .       I       .       .       .       .       .       .
XXXXXXXXLL
   19 .      .        .        .        .   I    .       .       .       .       .       .       .
XXXXXXXXLL
   20 .      .        .        .   I    .        .       .       .       .       .       .       .
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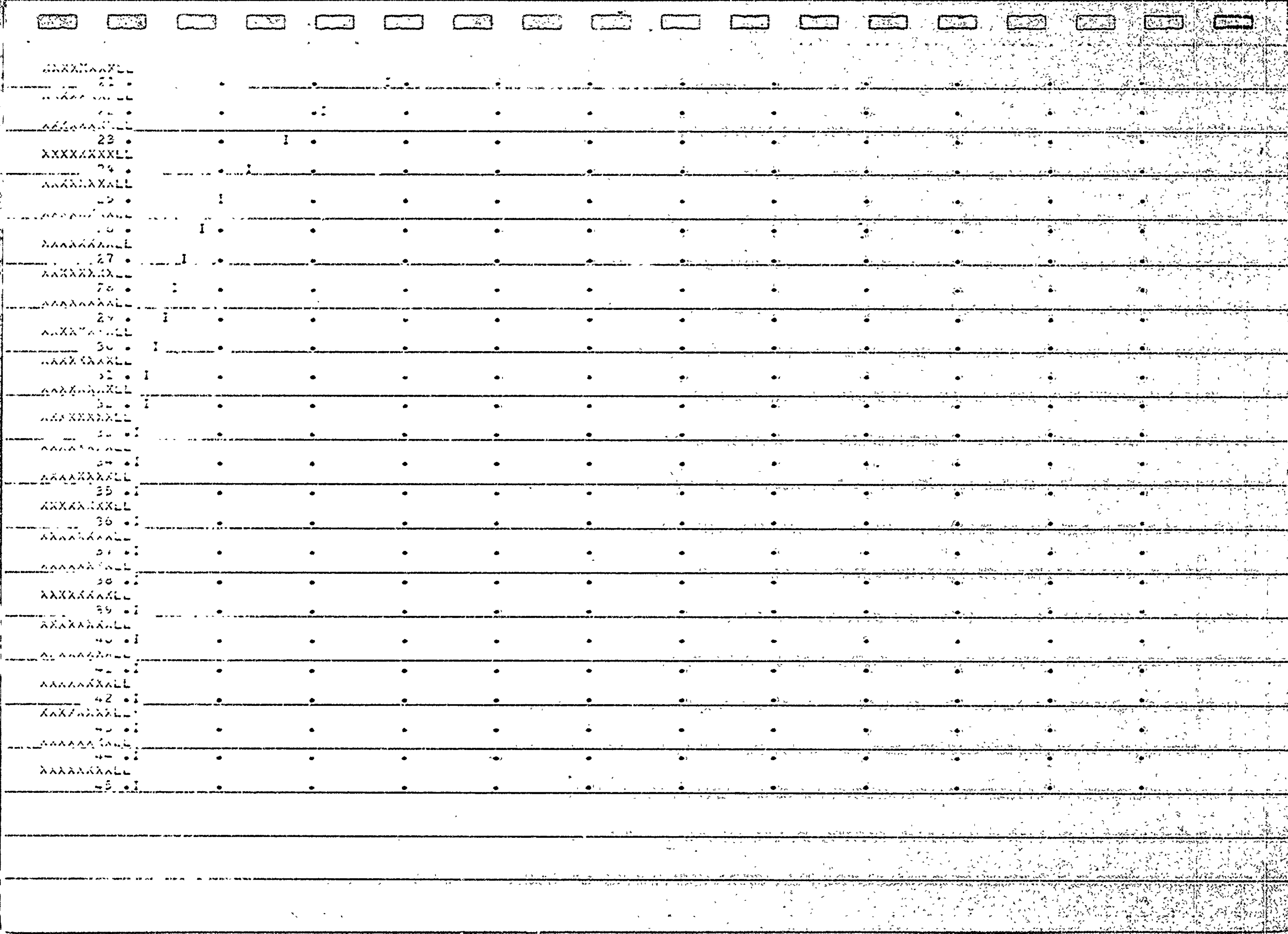
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YOLK

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HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	0	0	0	0	1

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
2	0	0	1.500	0.300	0.0	0.

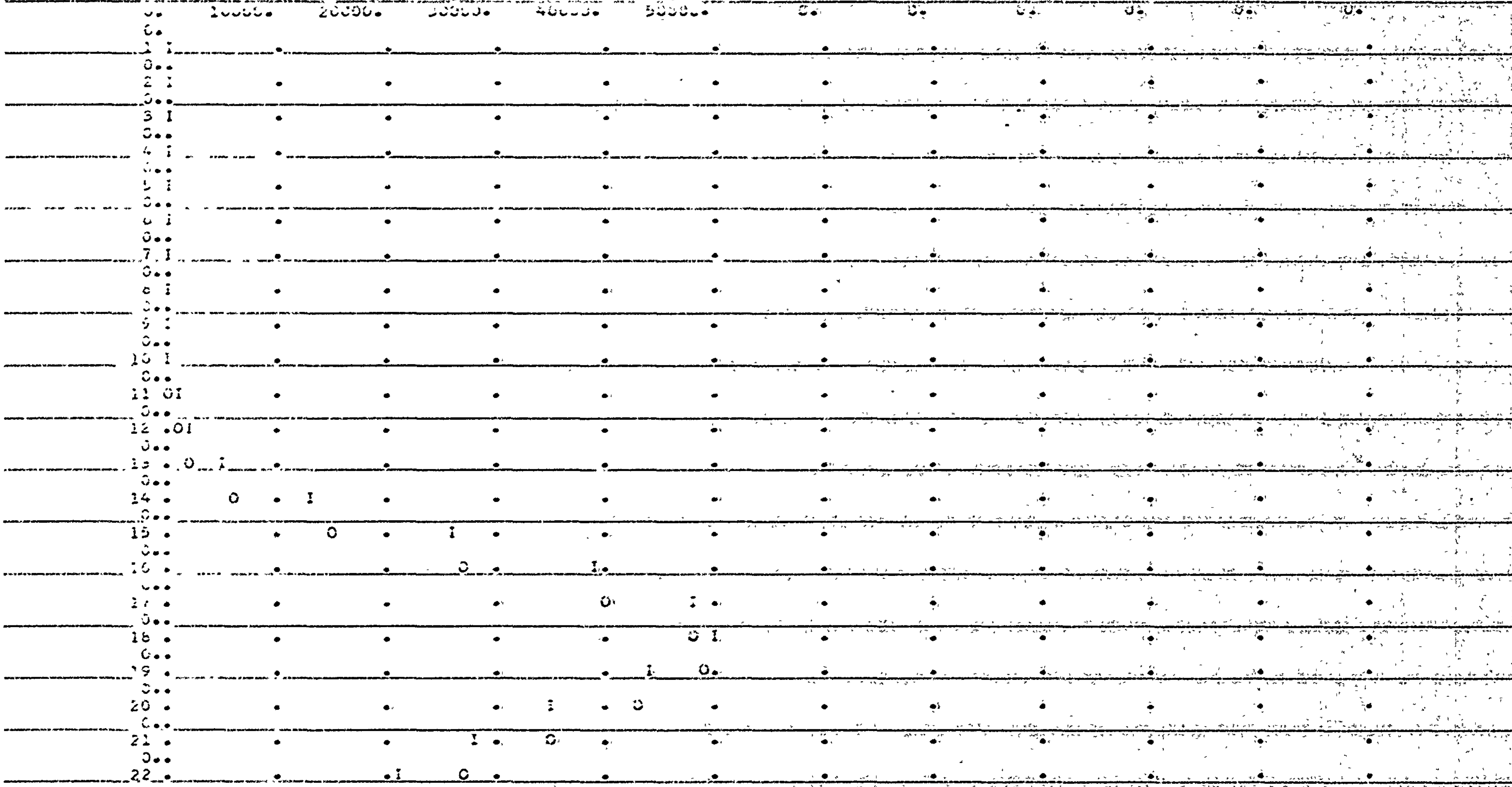
ROUTED FLOWS AT 2

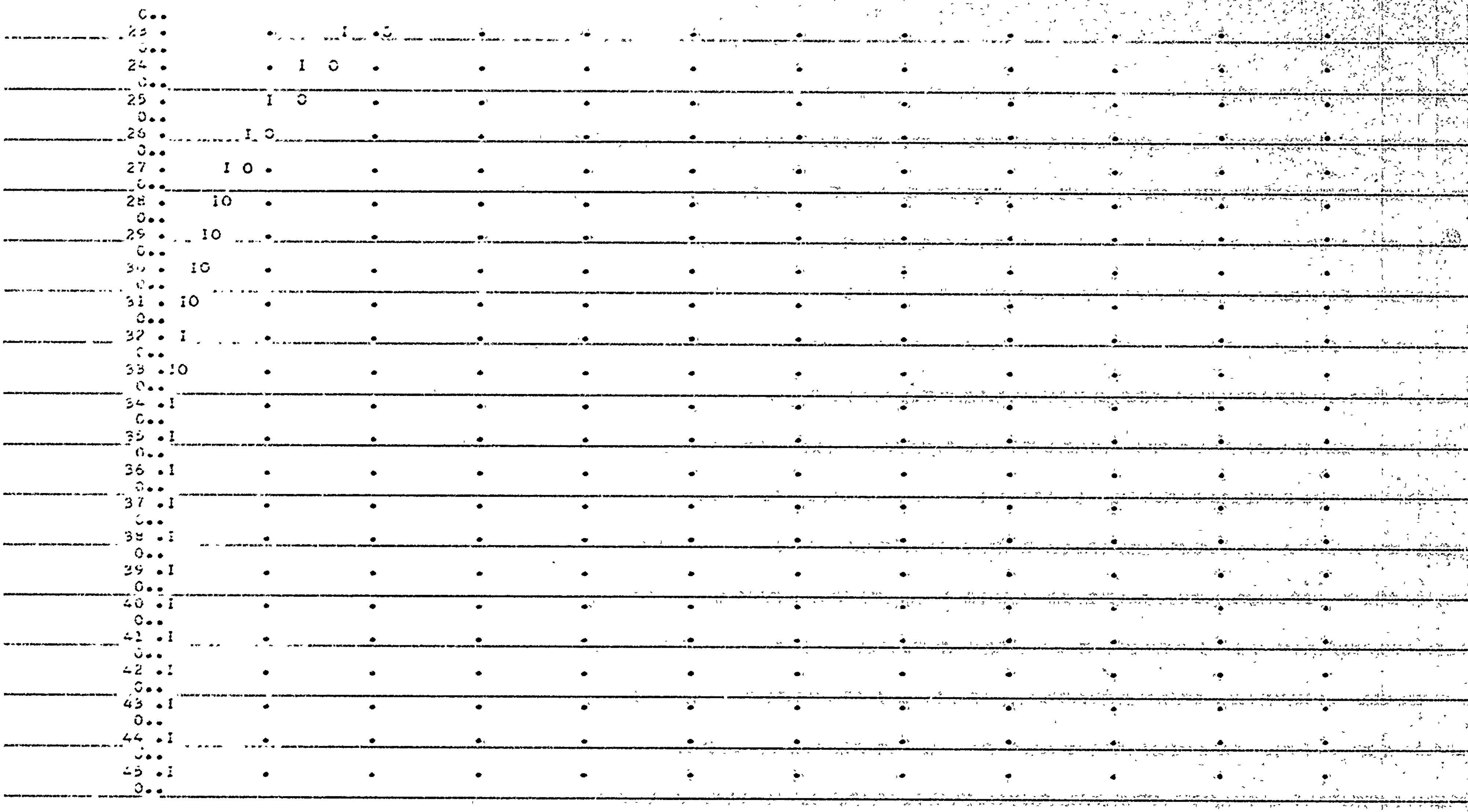
175.	174.	171.	166.	162.	157.	153.	149.	151.	157.
351.	503.	2402.	6275.	14647.	27276.	40022.	48179.	49099.	43460.
34560.	26788.	20817.	16130.	12514.	9710.	7538.	5856.	4553.	3543.
2761.	2154.	1684.	1371.	1234.	1239.	1240.	1213.	1180.	1150.
1120.	1091.	1063.	1035.	1009.					

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	49099.	48539.	36253.	15989.	398738.
INCHES		3.77	11.85	15.66	16.19
AC-FT		24151.	71945.	95196.	98415.

STATION

INFLOW I, OUTFLOW O, AND OBSERVED FLOW *





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RUNK*

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

SUBAREA 46

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
2	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	0	377.00	0.0	1055.00	0.0	0.0	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	16.00	66.50	81.00	91.50	97.50	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.912

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.07	0.0	0.0

UNIT HYDROGRAPH DATA

TC 24.40 R 26.10 NTA 0

RECESSION DATA

STRTQ 745.00 QRCSN 5300.00 RTIOR 1.30

UNIT HYDROGRAPH 61 END-OF-PERIOD ORDINATES, LAG 22.08 HOURS, CP 0.55 VOL 1.00

269.	999.	2017.	3167.	4361.	5306.	5895.	6078.	5742.	5131.
4573.	4076.	3633.	3238.	2886.	2572.	2293.	2043.	1821.	1623.
1447.	1290.	1149.	1025.	915.	814.	725.	647.	576.	514.
458.	408.	364.	324.	289.	258.	230.	205.	182.	163.
145.	129.	115.	103.	91.	81.	73.	65.	58.	51.
46.									

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.02	0.00	725.
2	0.02	0.00	707.
3	0.08	0.00	689.
4	0.08	0.00	671.
5	0.24	0.00	653.
6	0.48	0.00	636.
7	0.03	0.00	620.
8	0.03	0.00	604.
9	0.34	0.11	619.

10	0.34	0.12	720.
11	1.19	0.77	1159.
12	1.19	0.97	2376.
13	5.60	5.58	5239.
14	7.32	7.07	11955.
15	0.52	0.29	23085.
16	0.52	0.29	36677.
17	0.0	0.0	50901.
18	0.0	0.0	63681.
19	0.0	0.0	72765.
20	0.0	0.0	77128.
21	0.0	0.0	76437.
22	0.0	0.0	71133.
23	0.0	0.0	63864.
24	0.0	0.0	57054.
25	0.0	0.0	50859.
26	0.0	0.0	45590.
27	0.0	0.0	40488.
28	0.0	0.0	36117.
29	0.0	0.0	32221.
30	0.0	0.0	28747.
31	0.0	0.0	25651.
32	0.0	0.0	22850.
33	0.0	0.0	20429.
34	0.0	0.0	18234.
35	0.0	0.0	16277.
36	0.0	0.0	14533.
37	0.0	0.0	12977.
38	0.0	0.0	11590.
39	0.0	0.0	10353.
40	0.0	0.0	9256.
41	0.0	0.0	8266.
42	0.0	0.0	7388.
43	0.0	0.0	6606.
44	0.0	0.0	5908.
45	0.0	0.0	5297.
SUM	16.00	13.22	1049653.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	77128.	76808.	66527.	40399.	1049651.
INCHES		1.90	6.58	11.96	12.95
AC-FT		38106.	132220.	240514.	260378.

```
 *OVF*
                                          STATION     2

                          INFLOW I , OUTFLOW O  AND OBSERVED FLOW E
          0.    10000.    20000.    30000.    40000.    50000.    60000.    70000.    80000.         0.         0.         0.
 XXXXXXXO.
                                                                                                   PRECIP L  AND EXC
 LSS X
          0.        0.        0.        0.        0.        0.        0.        0.        8.         6.         4.         2.
 ESS X XO.
          1 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XO.L
          2 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XO.L
          3 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XO.L
          4 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XO.L
          5 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XOLX
          6 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XLLX
          7 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XLLL
          8 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XLLL
          9 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XLXX
         10 .I       .         .         .         .         .         .         .         .          .          .          .
 ESS X XLXX
         11 .I       .         .         .         .         .         .         .         .          .          .          .
 ESSLXXXXXX
         12 .  I     .         .         .         .         .         .         .         .          .          .          .
 ESSLXXXXXX
         13 .    I   .         .         .         .         .         .         .         .          .          . EXXXXXXXX
 XXXXXXXXXX
         14 .        . I       .         .         .         .         .         .         .  LLXXXXXXXXXXXXXXXXXXXXXXXXXX
 XXXXXXXXXX
         15 .        .         . I       .         .         .         .         .         .          .          .          .
 XXXLXXLLXX
         16 .        .         .         .      I  .         .         .         .         .          .          .          .
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         17 .        .         .         .         .         . I       .         .         .          .          .          .
 XXXXXXLLXL
         18 .        .         .         .         .         .         . I       .         .          .          .          .
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         19 .        .         .         .         .         .         .         .  I      .          .          .          .
 XXXXXXLLXL
         20 .        .         .         .         .         .         .         .       I .          .          .          .
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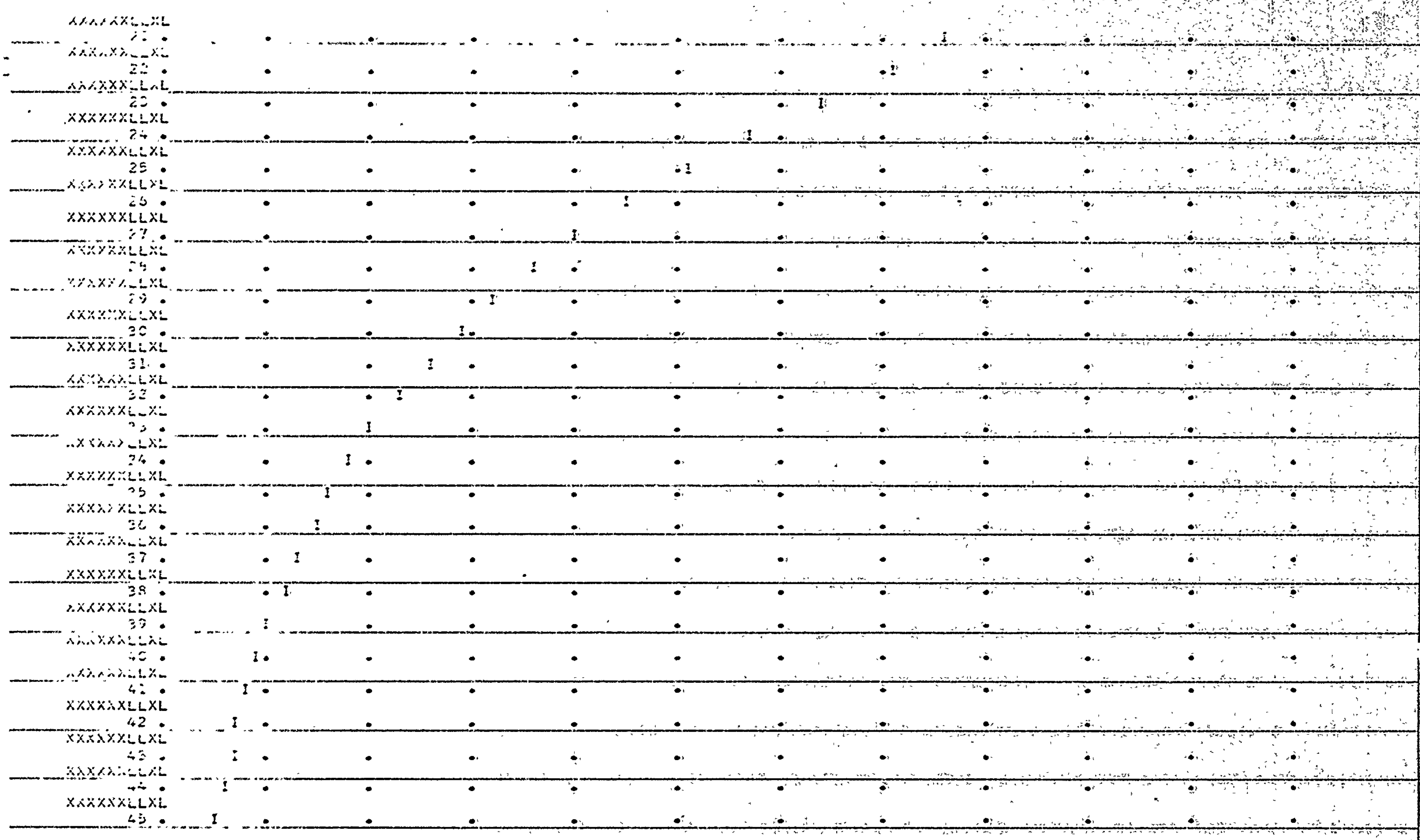

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COMBINE HYDROGRAPHS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
2	2	0	0	0	0	0

SUM OF 2 HYDROGRAPHS AT 2

901.	881.	839.	836.	811.	794.	773.	753.	770.	907.
1520.	3276.	7634.	18230.	37732.	63953.	90924.	111801.	121864.	120414.
111047.	97921.	84681.	73284.	63403.	55100.	48026.	41973.	36774.	32290.
28411.	25044.	22112.	19605.	17561.	15822.	14287.	12805.	11535.	10400.
9386.	8480.	7669.	6943.	6303.					

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	121864.	121139.	101487.	56239.	145283.
INCHES		2.30	7.69	12.81	13.70
AC-FT		60100.	201400.	335413.	358792.

ROUTE

STATION ?

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                       INFLOW I, OUTFLOW O, AND OBSERVED FLOW *
            0.   20000.    40000.    60000.    80000.   100000.   120000.   140000.        0.        0.        0.        0.
      XXXXXXLO.
           1 I          .         .         .         .         .         .         .         .         .         .         .
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           2 I          .         .         .         .         .         .         .         .         .         .         .
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           3 I          .         .         .         .         .         .         .         .         .         .         .
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          12 .  I       .         .         .         .         .         .         .         .         .         .         .
      XXXXXXLO..
          13 .    I     .         .         .         .         .         .         .         .         .         .         .
      XXXXXXLO..
          14 .         I.         .         .         .         .         .         .         .         .         .         .
      XXXXXXLO..
          15 .          .        I.         .         .         .         .         .         .         .         .         .
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          16 .          .         .         . I       .         .         .         .         .         .         .         .
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          17 .          .         .         .         .    I    .         .         .         .         .         .         .
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          22 .          .         .         .         .        I.         .         .         .         .         .         .
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      27 .         .         .   I     .         .         .         .         .         .         .         .         .
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      28 .         .         .I        .         .         .         .         .         .         .         .         .
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      29 .         .       I .         .         .         .         .         .         .         .         .         .
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      45 .  I      .         .         .         .         .         .         .         .         .         .         .
XXXXXXLO..
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CVN.

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HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
3	1	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
2	0	0	1.500	0.300	0.0	0.

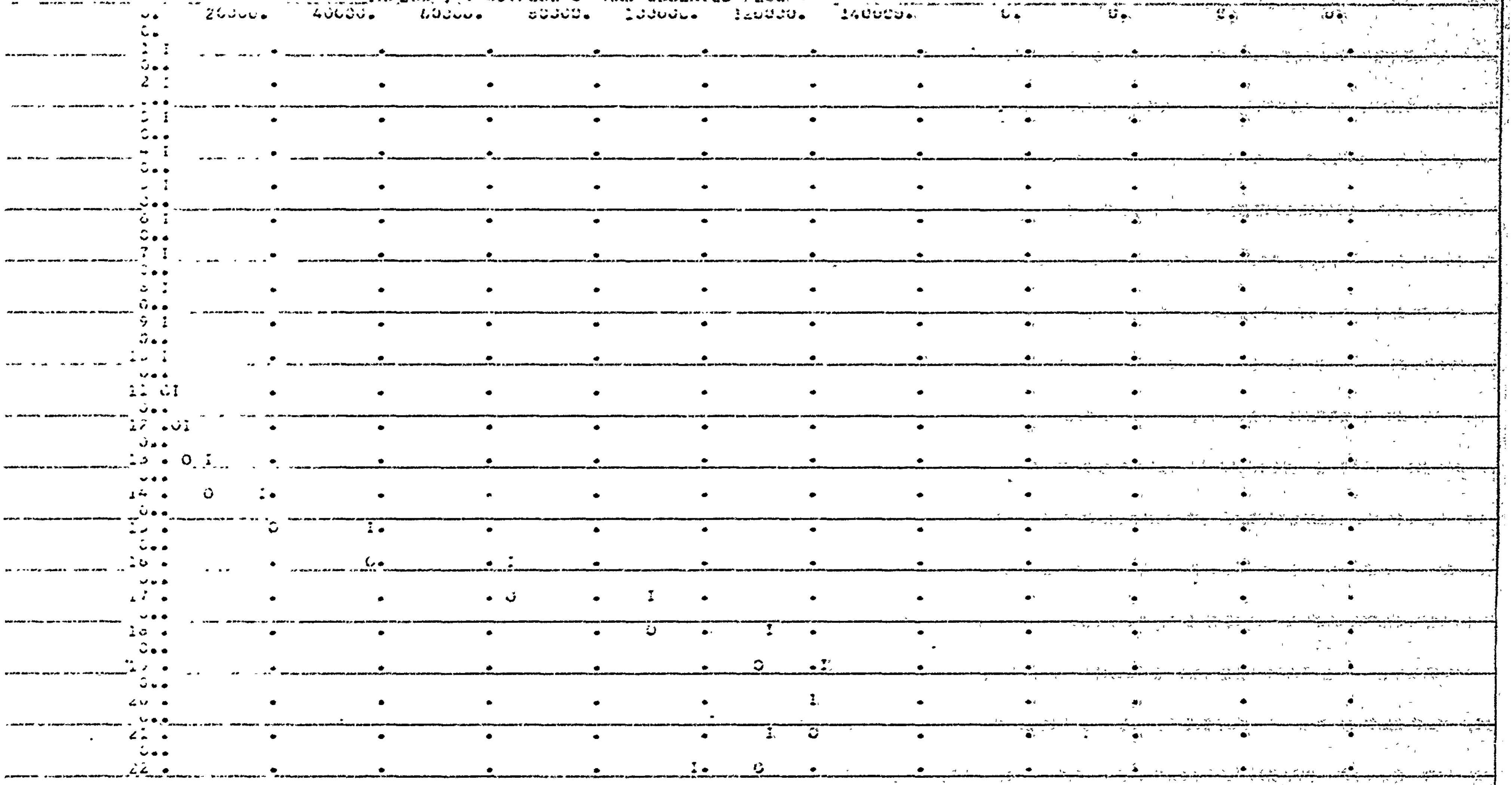
ROUTED FLOW AT 3

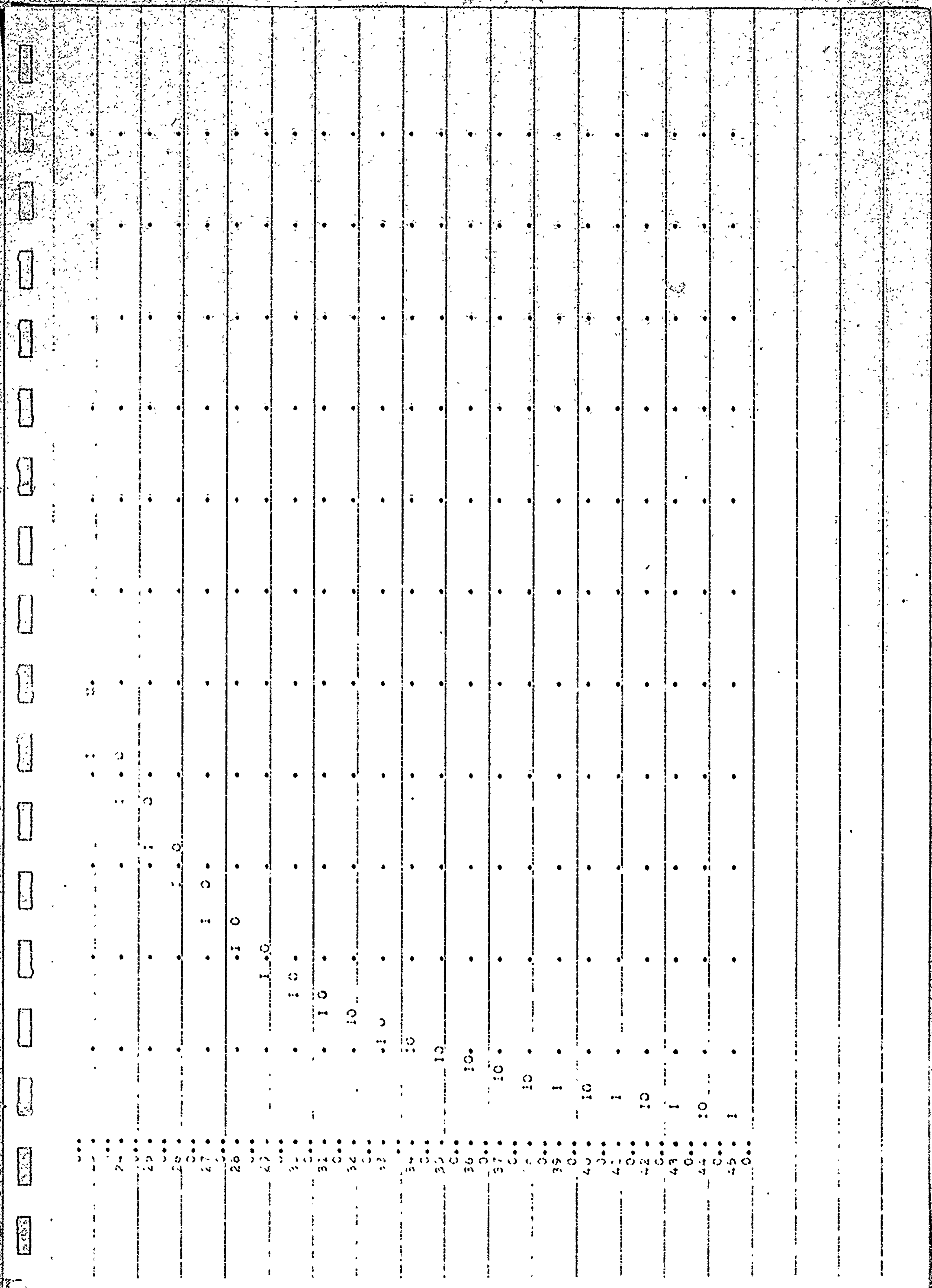
901.	695.	[illegible]	659.	637.	615.	794.	773.	760.	787.
978.	1674.	3627.	8483.	19255.	38215.	63570.	89962.	110543.	[illegible]
119560.	110886.	96094.	84924.	73330.	63541.	55209.	45118.	42050.	[illegible]
32345.	28458.	25084.	22155.	19654.	17580.	15827.	14243.	12812.	11546.
10410.	9396.	8489.	7677.	6952.					

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	120758.	120309.	101044.	56273.	1440916.
INCHES		7.28	7.66	12.79	13.35
AC-FT		59658.	200522.	335023.	357436.

STATION 3

INFLOW I , OUTFLOW O AND OBSERVED FLOW *





OVA

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

SUBAREA 47

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
3	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	0	564.00	0.0	1055.00	0.0	0.0	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	16.00	60.50	75.00	86.00	92.50	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.912

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.07	0.0	0.0

UNIT HYDROGRAPH DATA

TC 24.20 R 14.70 NTA 0

RECESSION DATA

STRTQ 1200.00 QRCSN 7600.00 RTIOR 1.30

UNIT HYDROGRAPH 31 END-OF-PERIOD ORDINATES, LAG 20.62 HOURS, CP 0.72 VOL 1.00

695.	2525.	4966.	7630.	10122.	11572.	12632.	12340.	10013.	9927.
7192.	5860.	4775.	3891.	3170.	2583.	2105.	1715.	1397.	1139.
928.	756.	616.	502.	409.	333.	272.	221.	180.	147.
120.									

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.05	0.00	1189.
2	0.05	0.00	1137.
3	0.09	0.00	1109.
4	0.09	0.00	1080.
5	0.25	0.00	1052.
6	0.50	0.00	1025.
7	0.04	0.00	999.
8	0.04	0.00	973.
9	0.36	0.14	1042.
10	0.36	0.14	1362.
11	1.19	0.97	2589.

12	2.29	[illegible]	[illegible]
13	[illegible]	5.05	[illegible]
14	0.88	0.43	[illegible]
15	0.54	[illegible]	[illegible]
16	[illegible]	0.32	[illegible]
17	0.0	0.0	[illegible]
18	0.0	0.0	132883.
19	0.0	0.0	145233.
20	0.0	0.0	147358.
21	0.0	0.0	137779.
22	0.0	0.0	118909.
23	0.0	0.0	[illegible]
24	0.0	0.0	80172.
25	0.0	0.0	[illegible]
26	0.0	0.0	53424.
27	0.0	0.0	[illegible]
28	0.0	0.0	[illegible]
29	0.0	0.0	27123.
30	0.0	0.0	[illegible]
31	0.0	0.0	[illegible]
32	0.0	0.0	15972.
33	0.0	0.0	[illegible]
34	0.0	0.0	10752.
35	0.0	0.0	[illegible]
36	0.0	0.0	7559.
37	0.0	0.0	[illegible]
38	0.0	0.0	[illegible]
39	0.0	0.0	[illegible]
40	0.0	0.0	[illegible]
41	0.0	0.0	[illegible]
42	0.0	0.0	6458.
43	0.0	0.0	6231.
44	0.0	0.0	6128.
45	0.0	0.0	5970.
SUM	15.19	12.34	1552049.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	147358.	[illegible]	[illegible]	61375.	[illegible]
INCHES		2.42	[illegible]	12.15	12.60
AC-FT		[illegible]	241207.	365394.	[illegible]

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STATION

INFLOW AND OUTFLOW AND OBSERVED FLOW
   0.   20000.   40000.   60000.   80000.  100000.  120000.  140000.  160000.      0.      0.      0.
XXXXXXXX                                                                          PRECIP L  AND EXC
LSS X
   0.       0.       0.       0.       0.       0.       0.       0.       8.      6.      4.      2.
LSS X LOO
   1 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LOOL
   2 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LOOL
   3 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LOOL
   4 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LOOL
   5 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LOLX
   6 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LLLX
   7 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LLLL
   8 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LLLL
   9 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LLAX
  10 .I     .        .        .        .        .        .        .        .       .       .       .
LSS X LLAX
  11 .I     .        .        .        .        .        .        .        .       .       .       .
LSSLXXXXXX
  12 .  I   .        .        .        .        .        .        .        .       .       .       .
LSSLXXXXXX
  13 .    I .        .        .        .        .        .        .        .       .       .  LXXXXXX
XXXXXXXXXX
  14 .      . I      .        .        .        .        .        .        .  LXXXXXXXXXXXXXXXXXXXXX
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  15 .      .        .   I    .        .        .        .        .        .       .       .       .
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  20 .      .        .        .        .        .        .        .    I   .       .       .       .
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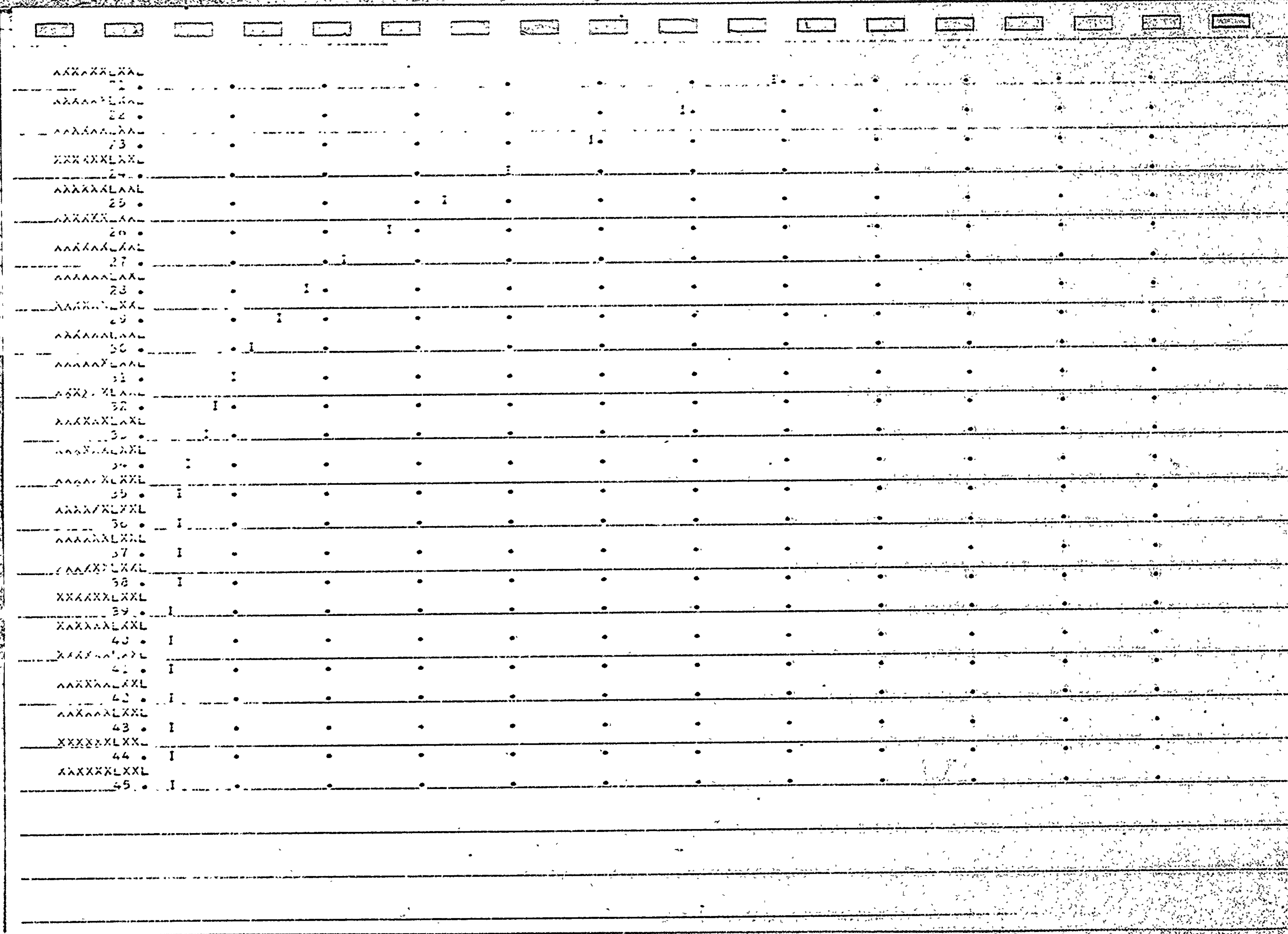

ROVKR

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COMBINE HYDROGRAPHS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
3	2	0	0	0	0	0

SUM OF 2 HYDROGRAPHS AT 3

2070.	2036.	1982.	1939.	1889.	1840.	1793.	1746.	1802.	2149.
3567.	7274.	16249.	38644.	72151.	115902.	173617.	222851.	258376.	268116.
257659.	229795.	196056.	165097.	135761.	116955.	98828.	83753.	71178.	60662.
51844.	44430.	38181.	32907.	28493.	25139.	23191.	21416.	19800.	18354.
17040.	15855.	14780.	13805.	12922.					

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	268116.	262877.	221193.	117189.	2992986.
INCHES		2.32	7.80	12.40	13.20
AC-FT		130420.	438956.	697685.	742441.

```
ROUTE

                                        STATION    3

                       INFLOW I , OUTFLOW O , AND OBSERVED FLOW *
     0.     40000.    80000.    120000.   160000.   200000.   240000.   280000.       0.        0.        0.        0.
XXXXXXLO.
      1 .I     .         .         .         .         .         .         .         .         .         .         .
XXXXXXLO..
      2 .I     .         .         .         .         .         .         .         .         .         .         .
XXXXXXLO..
      3 I      .         .         .         .         .         .         .         .         .         .         .
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     16 .      .         .         I         .         .         .         .         .         .         .         .
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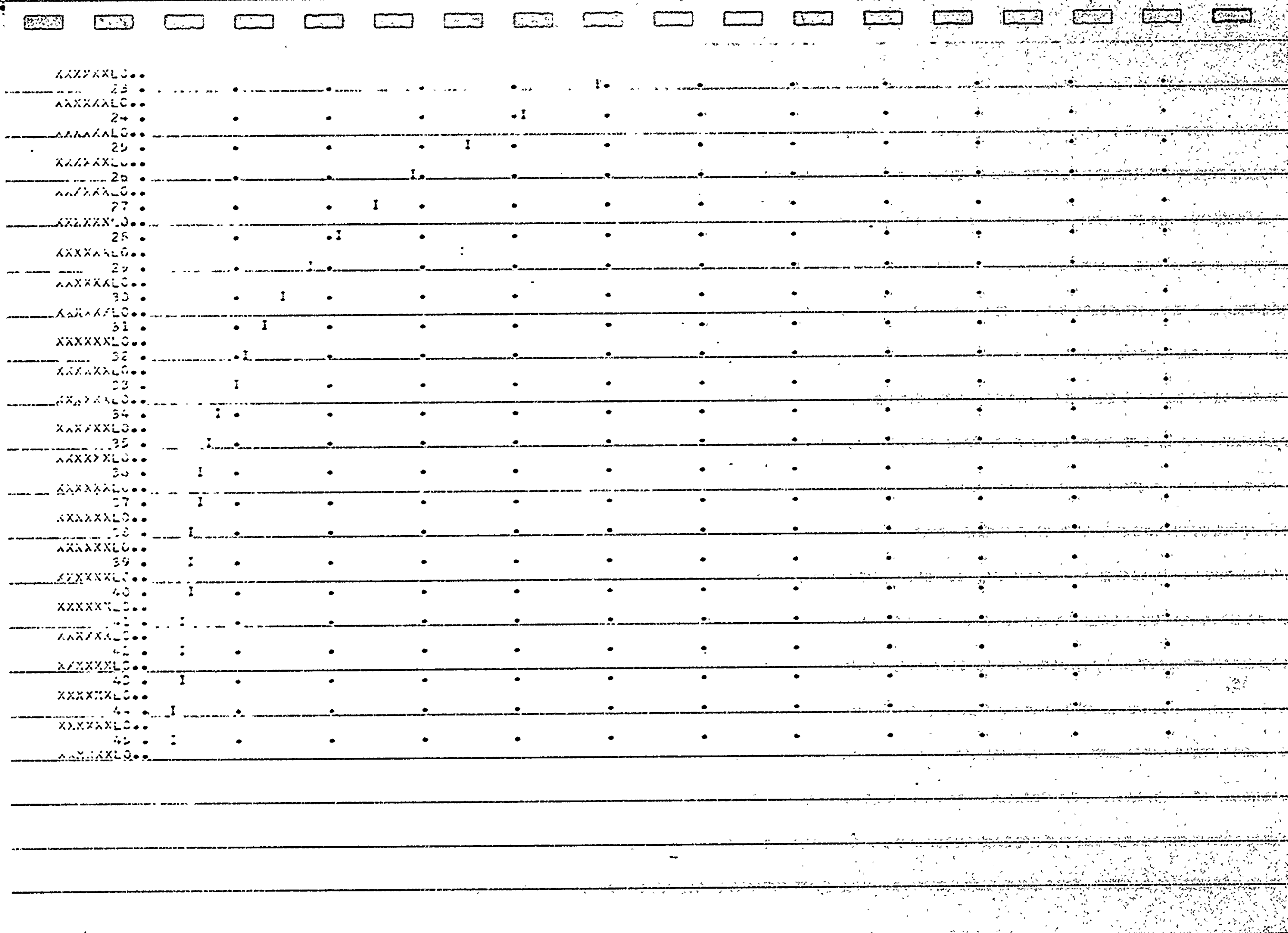
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OVX

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HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
4	1	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	-1.

STORAGE	0.	76446.	154716.	207910.	261872.	316354.	371315.	426754.	510805.	595989.
OUTFLOW	0.	7940.	23150.	35970.	55570.	74720.	91160.	108800.	137350.	160230.

TIME	EOP STOR	AVG IN	EOP OUT
1	19930.	2070.	2070.
2	19925.	2053.	2070.
3	19912.	2014.	2068.
4	19887.	1560.	2065.
5	19850.	1714.	2062.
6	19801.	1865.	2057.
7	19743.	1316.	2051.
8	19674.	1769.	2043.
9	19608.	1774.	2037.
10	19593.	1975.	2035.
11	19794.	2858.	2055.
12	20620.	5470.	2143.
13	22997.	11612.	2399.
14	28886.	26446.	3006.
15	41467.	54397.	4307.
16	63918.	96026.	6639.
17	97579.	145760.	12124.
18	145336.	198234.	21850.
19	195760.	232613.	33042.
20	250786.	262245.	47571.
21	301612.	262378.	66186.
22	343322.	243717.	82757.
23	374427.	212925.	92150.
24	395518.	180576.	98861.
25	408176.	151927.	102889.
26	414132.	127658.	104784.
27	414873.	107891.	105020.
28	411598.	91290.	103978.
29	405274.	77465.	101989.
30	395675.	65920.	99229.

31	[illegible]	[illegible]	[illegible]
32	[illegible]	42137.	[illegible]
33	[illegible]	[illegible]	[illegible]
34	[illegible]	[illegible]	[illegible]
35	[illegible]	[illegible]	[illegible]
36	324252.	[illegible]	77052.
37	311081.	[illegible]	72849.
38	[illegible]	22303.	[illegible]
39	[illegible]	[illegible]	62529.
40	273633.	19077.	58002.
41	269166.	17697.	53803.
42	[illegible]	16448.	50156.
43	251997.	15317.	47898.
44	243936.	14292.	45717.
45	236174.	13363.	43617.

SUM 2136112.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	105020.	104902.	101587.	80818.	2136112.
INCHES		0.92	3.56	8.55	9.42
AC-FT		52044.	201598.	481149.	529888.

```
RIVER                                  STATION   4

                         INFLOW I , OUTFLOW O , AND OBSERVED FLOW *
      0.     40000.    80000.   120000.   160000.   200000.   240000.   280000.       0.       0.       0.       0.
XXXXXXLO.
      1 .I        .         .         .         .         .         .         .        .        .        .        .
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      2 .I        .         .         .         .         .         .         .        .        .        .        .
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      4 IO        .         .         .         .         .         .         .        .        .        .        .
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      9 IO        .         .         .         .         .         .         .        .        .        .        .
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     10 IO        .         .         .         .         .         .         .        .        .        .        .
XXXXXXLO..
     11 .I        .         .         .         .         .         .         .        .        .        .        .
XXXXXXLO..
     12 .I        .         .         .         .         .         .         .        .        .        .        .
XXXXXXLO..
     13 .O I      .         .         .         .         .         .         .        .        .        .        .
XXXXXXLO..
     14 .O    I   .         .         .         .         .         .         .        .        .        .        .
XXXXXXLO..
     15 .O        .   I     .         .         .         .         .         .        .        .        .        .
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     16 . O       .         .  I      .         .         .         .         .        .        .        .        .
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     17 .  O      .         .         .     I   .         .         .         .        .        .        .        .
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     18 .    O    .         .         .         .         I         .         .        .        .        .        .
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     19 .       O .         .         .         .         .         I         .        .        .        .        .
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     20 .         . O       .         .         .         .         .     I   .        .        .        .        .
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     21 .         .      O  .         .         .         .         .     I   .        .        .        .        .
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     22 .         .         .O        .         .         .         .I        .        .        .        .        .
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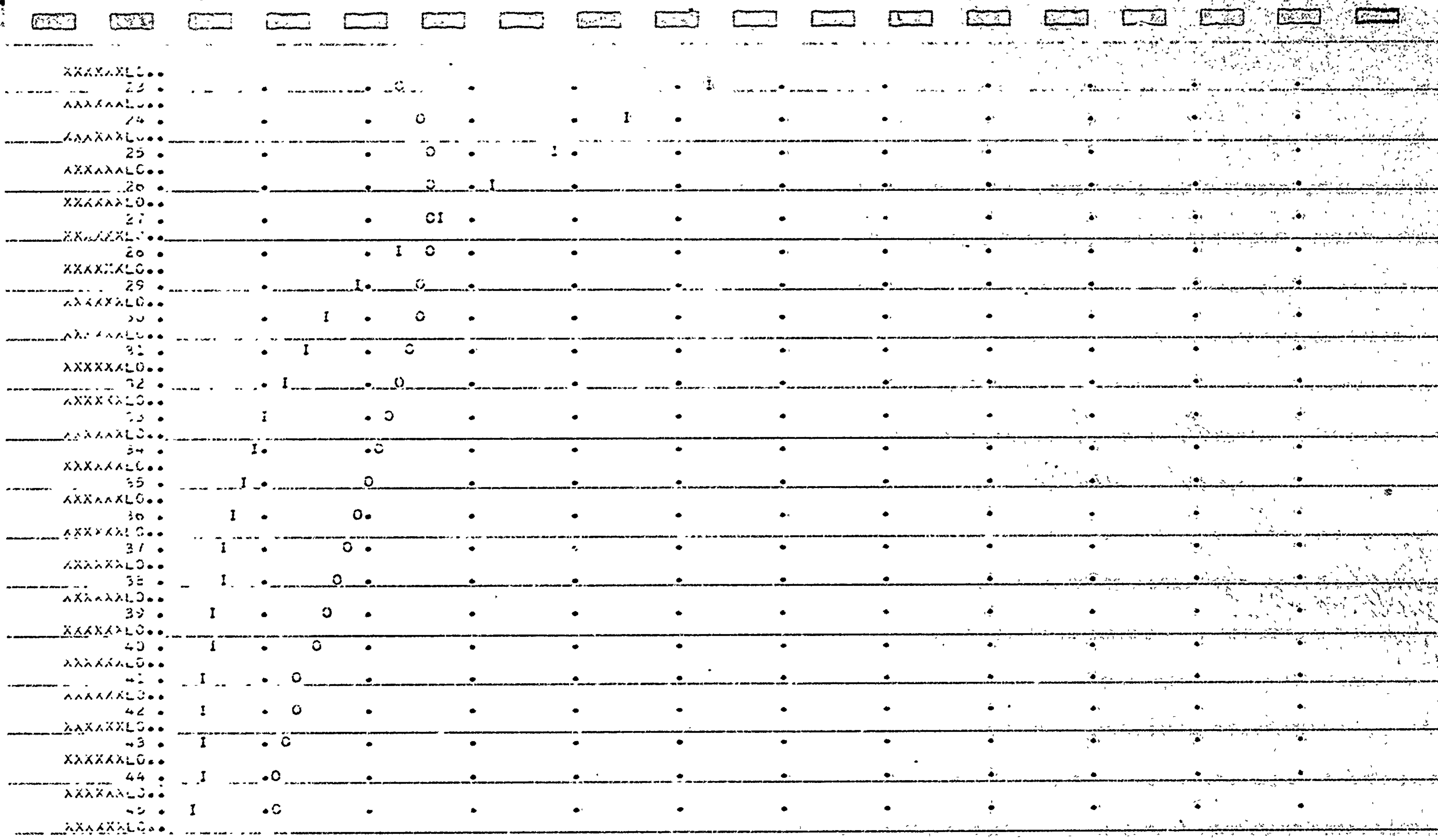
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RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	49930.	49349.	26459.	15995.	114.00
ROUTED TO	2	[illegible]	48839.	[illegible]	[illegible]	114.00
HYDROGRAPH AT	2	77123.	76806.	66627.	40353.	377.00
2 COMBINED	2	121564.	121139.	101437.	56339.	491.00
ROUTED TO	3	120751.	120507.	101044.	56273.	491.00
HYDROGRAPH AT	3	147358.	146598.	121540.	61375.	564.00
2 COMBINED	3	268116.	262877.	221193.	117169.	1055.00
ROUTED TO	4	155020.	154902.	111587.	80215.	1055.00

```
****************************
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
****************************
                    SACANDAGA RESERVOIR - NEW YORK
                    RESERVOIR AT TOP OF FLOOD CONTROL POOL
                    TEST SPF

                                 JOB SPECIFICATION
                    NO   NHR  NMIN  IDAY   IHR  IMIN METRC  IPLT  IPRT NSTAN
                    45     3     0     0     0     0     0     2     0     0
                                       JOPER   NWT
                                           3     0

     **********     **********     **********     **********     **********

                              SUB-AREA RUNOFF COMPUTATION

          SUBAREA 45
                    ISTAG   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME
                        1       0       0       0       0       0       1

                                   HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1       0  114.00     0.0 1055.00     0.0     0.0       0       0       0

                                     PRECIP DATA
                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                   12.20     0.0     0.0     0.0     0.0     0.0     0.0     0.0
TRSPC COMPUTED BY THE PROGRAM IS 0.912

                                      LOSS DATA
          STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
            0.0     0.0    1.00     0.0     0.0    1.00    1.00    0.07     0.0     0.0

                                UNIT HYDROGRAPH DATA
                           TC  16.20    R  11.80    NTA   0

                                    RECESSION DATA
                        STRTQ   180.00    QRCSN  1350.00    RTIOR  1.30

          UNIT HYDROGRAPH 24 END-OF-PERIOD ORDINATES, LAG  13.90 HOURS, CP 0.65  VOL 1.00
       312.    1122.    2164.    3043.    3436.    3177.    2539.    1966.    1523.    1179.
       913.     707.     548.     424.     329.     254.     197.     153.     118.      92.
        71.      55.      43.      33.
```

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.01	0.00	175.
2	0.01	0.00	171.
3	0.03	0.00	166.
4	0.03	0.00	162.
5	0.09	0.00	158.
6	0.19	0.00	154.
7	0.02	0.00	150.
8	0.02	0.00	145.
9	0.05	0.00	142.
10	0.05	0.00	138.
11	0.12	0.00	135.
12	0.12	0.00	131.
13	0.41	0.06	147.
14	[illegible]	0.61	381.
15	0.07	0.00	934.
16	0.07	0.00	1617.
17	0.24	0.02	2177.
18	0.24	0.02	2416.
19	0.63	0.41	2373.
20	0.63	0.41	2423.
21	2.15	1.92	3426.
22	4.36	4.14	6753.
23	0.39	0.17	12446.
24	0.39	0.17	18494.
25	0.02	0.00	22678.
26	0.02	0.00	23514.
27	0.05	0.00	20920.
28	0.05	0.00	16806.
29	0.16	0.00	13132.
30	0.32	0.10	10230.
31	0.03	0.00	8025.
32	0.03	0.00	6357.
33	0.0	0.0	5072.
34	0.0	0.0	4048.
35	0.0	0.0	3200.
36	0.0	0.0	2560.
37	0.0	0.0	1949.
38	0.0	0.0	1507.
39	0.0	0.0	1332.
40	0.0	0.0	1297.
41	0.0	0.0	1264.
42	0.0	0.0	1231.
43	0.0	0.0	1199.
44	0.0	0.0	1168.
45	0.0	0.0	1138.
SUM	11.83	8.03	204006.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	23514.	22096.	17278.	8059.	204006.
INCHES		1.88	5.64	7.89	8.32
AC-FT		11453.	34288.	47980.	50606.

```
*OVF*
                                   STATION    1

                    INFLOW I , OUTFLOW O  AND OBSERVED FLOW *
      0.      4000.     8000.    12000.    16000.    20000.    24000.        0.       0.       0.       0.       0.
 * XXXXXO.
                                                                                       PRECIP L  AND EXC
  ESS X
      0.        0.        0.        0.        0.        0.        0.        0.        0.       6.       4.       2.
  ESS X XO.
      1 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XO.L
      2 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XO.L
      3 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XO.L
      4 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XO.L
      5 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XO.L
      6 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XOLX
      7 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XOLL
      8 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XOLL
      9 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XOLL
     10 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XOLL
     11 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XOLX
     12 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XOLX
     13 I       .         .         .         .         .         .         .         .        .        .        .
  ESS X XLLX
     14 .I      .         .         .         .         .         .         .         .        .        .        .
  ESS XLXXXX
     15 . I     .         .         .         .         .         .         .         .        .        .        .
  ESS XLXXXL
     16 .   I   .         .         .         .         .         .         .         .        .        .        .
  ESS XLXXXL
     17 .    I  .         .         .         .         .         .         .         .        .        .        .
  ESS XLXXLX
     18 .     I .         .         .         .         .         .         .         .        .        .        .
  ESS XLXXLX
     19 .     I .         .         .         .         .         .         .         .        .        .        .
  ESS XLLXXX
     20 .     I .         .         .         .         .         .         .         .        .        .        .
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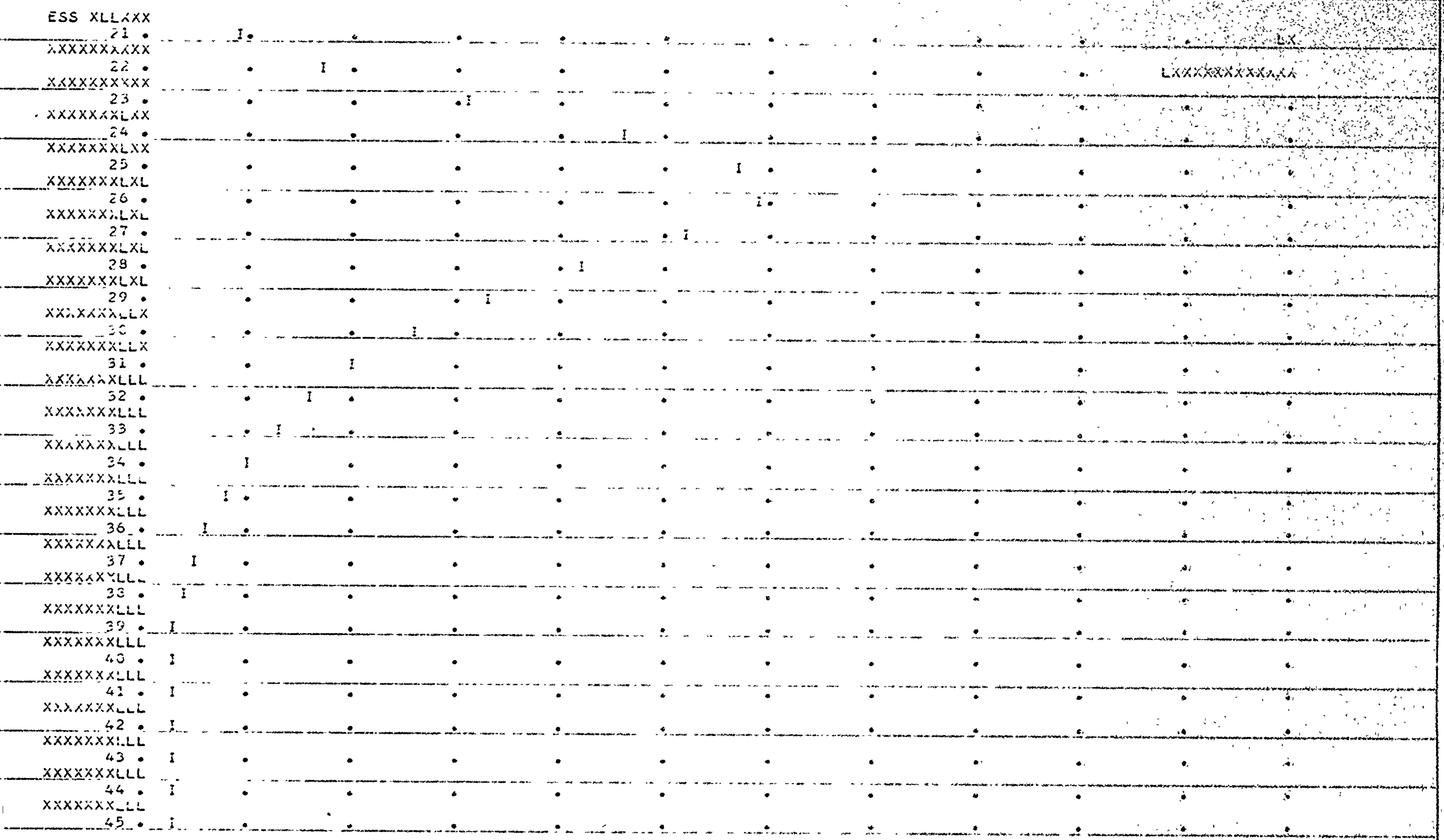
ESS XLLXXX
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OVN

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                                  HYDROGRAPH ROUTING
                    ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME
                        2       1       0       0      0      0       0
                                  ROUTING DATA
                        QLOSS   CLOSS     AVG    IRES  ISAME
                          0.0     0.0     0.0      0      0

                    NSTPS   NSTDL     LAG   AMSKK      X     TSK   STORA
                        2       0       0   1.300  0.300     0.0      0.

                                  ROUTED FLOWS AT      2
       175.     174.     171.     166.     162.     157.     153.     149.     145.     142.
       138.     134.     135.     194.     461.    1016.    1680.    2196.    2411.    2434.
      2622.    3978.    7528.   13151.   18936.   22684.   23130.   20455.   16393.   12742.
      9948.    7603.    6187.    4936.    3936.    3110.    2430.    1870.    1499.    1317.
      1290.    1262.    1226.    1195.    1164.

                       PEAK   6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
             CFS     23130.   22937.    17150.     6657.        205171.
          INCHES               2.07      5.41      7.89           8.29
           AC-FT              11365.    34093.    47966.         50899.
```

```
*OVF*
                                   STATION    2

                     INFLOW I - OUTFLOW O  AND OBSERVED FLOW *
        0.     4000.    8000.   12000.   16000.   20000.   24000.      0.       0.       0.       0.       0.
 *      0.
        1 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
        2 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
        3 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
        4 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
        5 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
        6 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
        7 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
        8 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
        9 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
       10 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
       11 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
       12 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
       13 I        .        .        .        .        .        .        .        .        .        .        .
 *      0..
       14 OI       .        .        .        .        .        .        .        .        .        .        .
 *      0..
       15 .OI      .        .        .        .        .        .        .        .        .        .        .
 *      0..
       16 .   OI   .        .        .        .        .        .        .        .        .        .        .
 *      0..
       17 .    OI  .        .        .        .        .        .        .        .        .        .        .
 *      0..
       18 .     OI .        .        .        .        .        .        .        .        .        .        .
 *      0..
       19 .      I .        .        .        .        .        .        .        .        .        .        .
 *      0..
       20 .      I .        .        .        .        .        .        .        .        .        .        .
 *      0..
       21 .      O I.       .        .        .        .        .        .        .        .        .        .
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       22 .        O     I  .        .        .        .        .        .        .        .        .        .
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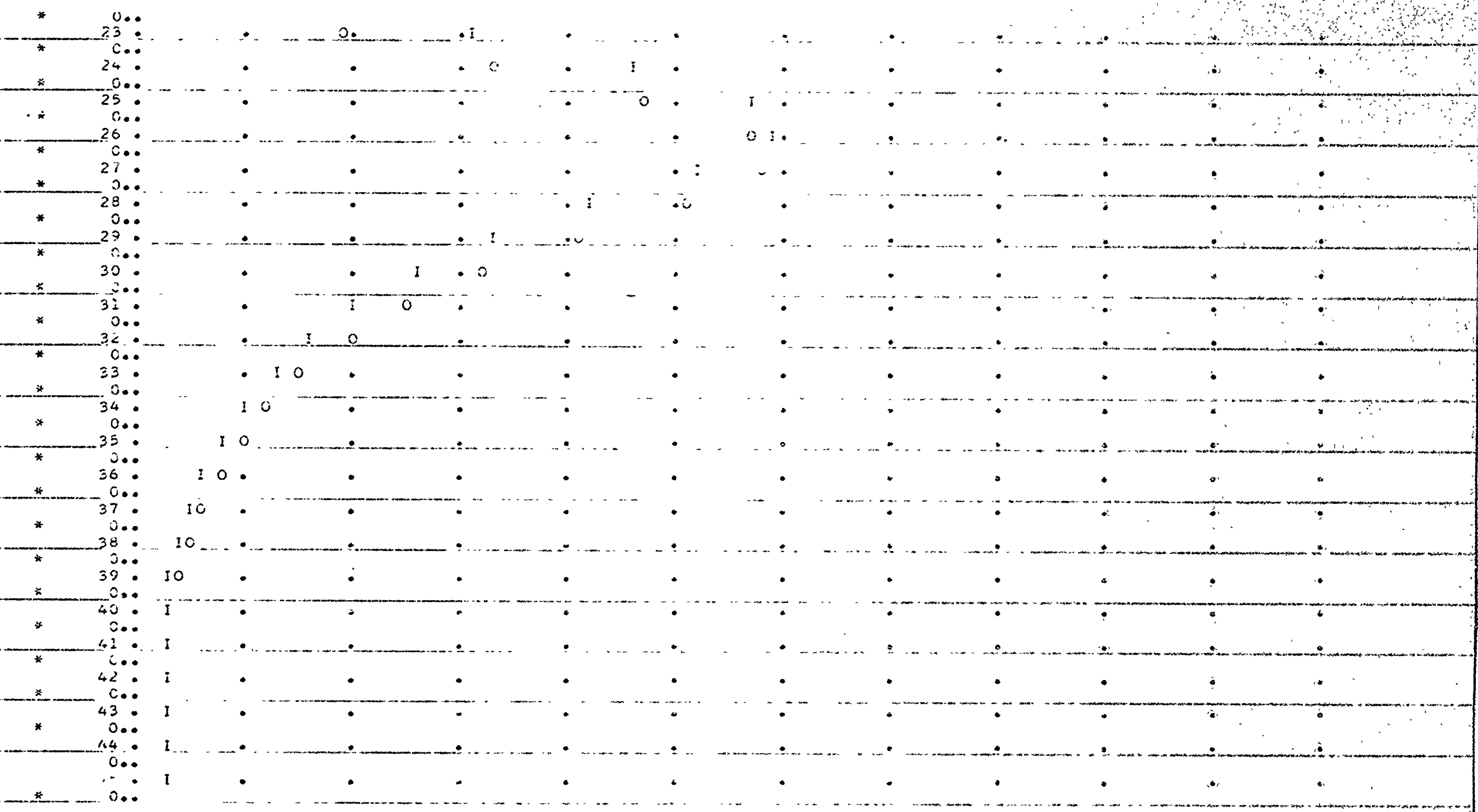
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                                        SUB-AREA RUNOFF COMPUTATION

                SUBAREA 46
                          ISTAQ     ICOMP     IECON     ITAPE     JPLT     JPRT     INAME
                              2         0         0         0        0        0         1

                                              HYDROGRAPH DATA
                IHYDG     IUHG     TAREA      SNAP     TRSDA     TRSPC     RATIO     ISNOW     ISAME     LOCAL
                    1        0    377.00      0.0    1055.00      0.0       0.0         0         0         0

                                              PRECIP DATA
                         SPFE       PMS        R6       R12       R24       R48       R72       R96
                        11.20       0.0       0.0       0.0       0.0       0.0       0.0       0.0
TRSPC COMPUTED BY THE PROGRAM IS 0.912

                                              LOSS DATA
               STRKR     DLTKR     RTIOL     ERAIN     STRKS     RTIOK     STRTL     CNSTL     ALSMX     RTIMP
                 0.0       0.0      1.00       0.0       0.0      1.00      1.00      0.07       0.0       0.0

                                          UNIT HYDROGRAPH DATA
                                 TC   24.40       R   26.10      NTA     0

                                              RECESSION DATA
                           STRTQ    745.00      QRCSN    530.00      RTIOR    1.30

             UNIT HYDROGRAPH 51 END-OF-PERIOD ORDINATES, LAG   22.08 HOURS, CP  0.55  VOL  1.00
          269.      999.     2017.     3187.     4361.     5306.     5895.     6078.     5742.     5131.
         4573.     4076.     3633.     3238.     2886.     2572.     2293.     2043.     1821.     1623.
         1447.     1290.     1149.     1025.      913.      814.      725.      647.      576.      514.
          458.      408.      364.      324.      289.      258.      230.      205.      182.      163.
          145.      129.      115.      103.       91.       81.       73.       65.       58.       51.
           46.

                                           END-OF-PERIOD FLOW
                                     TIME     RAIN     EXCS      COMP Q
                                        1     0.01     0.00       726.
                                        2     0.01     0.00       707.
                                        3     0.02     0.00       689.
                                        4     0.02     0.00       671.
                                        5     0.09     0.00       653.
                                        6     0.18     0.00       636.
                                        7     0.01     0.00       620.
                                        8     0.01     0.00       604.
                                        9     0.04     0.00       588.
```

10	0.04	0.00	572.
11	0.10	0.00	559.
12	0.10	0.00	544.
13	0.39	0.01	512.
14	0.60	0.57	679.
15	0.06	0.00	1093.
16	0.06	0.00	1674.
17	0.18	0.00	2341.
18	0.18	0.00	3009.
19	0.53	0.00	3625.
20	0.53	0.30	4255.
21	2.06	1.83	5369.
22	4.17	3.95	8222.
23	0.32	0.10	13343.
24	0.32	0.10	19912.
25	0.01	0.00	27014.
26	0.01	0.00	33556.
27	0.04	0.00	38206.
28	0.04	0.00	40667.
29	0.15	0.00	40373.
30	0.31	0.08	37530.
31	0.02	0.00	[illegible]
32	0.02	0.00	30193.
33	0.0	0.0	27055.
34	0.0	0.0	24267.
35	0.0	0.0	21773.
36	0.0	0.0	19529.
37	0.0	0.0	17499.
38	0.0	0.0	15647.
39	0.0	0.0	13970.
40	0.0	0.0	12474.
41	0.0	0.0	11140.
42	0.0	0.0	9950.
43	0.0	0.0	8889.
44	0.0	0.0	7943.
45	0.0	0.0	7099.
SUM	10.83	7.24	5502[illegible]

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40667.	40520.	35173.	21669.	550200.
INCHES		1.00	3.47	6.42	6.79
AC-FT		20103.	69800.	129005.	136484.

```
*OVF*
                                          STATION    2

                              INFLOW I , OUTFLOW O  AND OBSERVED FLOW *
        0.     5000.    10000.    15000.    20000.    25000.    30000.    35000.    40000.    45000.        0.        0.
 XXXXXXXO.
                                                                                                    PRECIP L  AND EXC
 ESS X
        0.        0.        0.        0.        0.        0.        0.        0.        0.        6.        4.        2.
 ESS X XO.
       1 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XO.L
       2 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XO.L
       3 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XO.L
       4 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XO.L
       5 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XO.L
       6 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XOLX
       7 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XOLL
       8 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XOLL
       9 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XOLL
      10 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XOLL
      11 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XOLX
      12 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XOLX
      13 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS X XLLX
      14 .I          .         .         .         .         .         .         .         .         .         .         .
 ESS XLXXXX
      15 . I         .         .         .         .         .         .         .         .         .         .         .
 ESS XLXXXL
      16 .  I        .         .         .         .         .         .         .         .         .         .         .
 ESS XLXXXL
      17 .     I     .         .         .         .         .         .         .         .         .         .         .
 ESS XLXXLX
      18 .      I    .         .         .         .         .         .         .         .         .         .         .
 ESS XLXXLX
      19 .       I   .         .         .         .         .         .         .         .         .         .         .
 ESS XLLXXX
      20 .          I.         .         .         .         .         .         .         .         .         .         .
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ESS XLLXXX
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OVN

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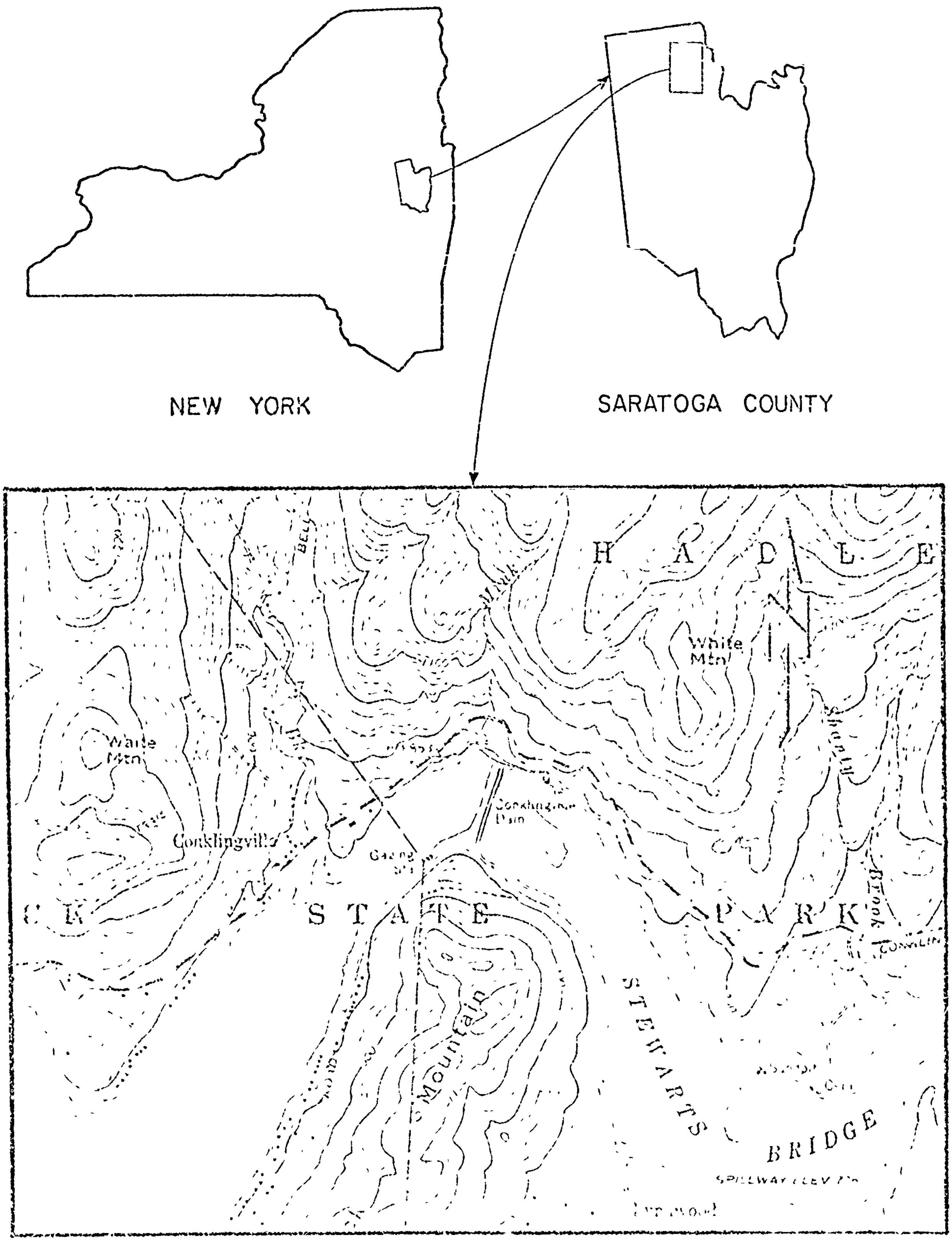
**********     **********     **********     **********     **********

                              COMBINE HYDROGRAPHS
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME
                         2       2       0       0       0       0       0

                          SUM OF 2 HYDROGRAPHS AT       2
     901.      881.      859.      836.      815.      794.      773.      753.      734.      715.
     696.      678.      667.      573.     1554.     2689.     4021.     5205.     6036.     6659.
    7991.    12200.    20872.    33062.    45950.    56240.    61436.    61122.    56766.    50272.
   43651.    37996.    33242.    29203.    25709.    22638.    19928.    17537.    15470.    13791.
   12429.    11211.    10115.     9138.     8263.

                         PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
                 CFS   61436.    61279.    51679.    29510.       753372.
              INCHES               1.16      3.92      6.71          7.14
               AC-FT             30402.   102557.   175687.       186885.
```



Portion of Conklingville, New York 7.5 minute U.S.G.S. quadrangle

CONKLINGVILLE DAM

SITE LOCATION MAP

SCALE : 1"=2000'

```
*OVF*
                                                   STATION     2

                            INFLOW I , OUTFLOW O, AND OBSERVED FLOW *
         0.    10000.    20000.    30000.    40000.    50000.    60000.    70000.        0.        0.        0.        0.
XXXXXXXX0.
        1 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
        2 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
        3 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
        4 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
        5 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
        6 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
        7 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
        8 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
        9 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       10 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       11 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       12 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       13 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       14 .I        .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       15 . I       .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       16 .  I      .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       17 .   I     .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       18 .    I    .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       19 .      I  .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       20 .       I .         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       21 .        I.         .         .         .         .         .         .         .         .         .         .
XXXXXXXX0..
       22 .         . I       .         .         .         .         .         .         .         .         .         .
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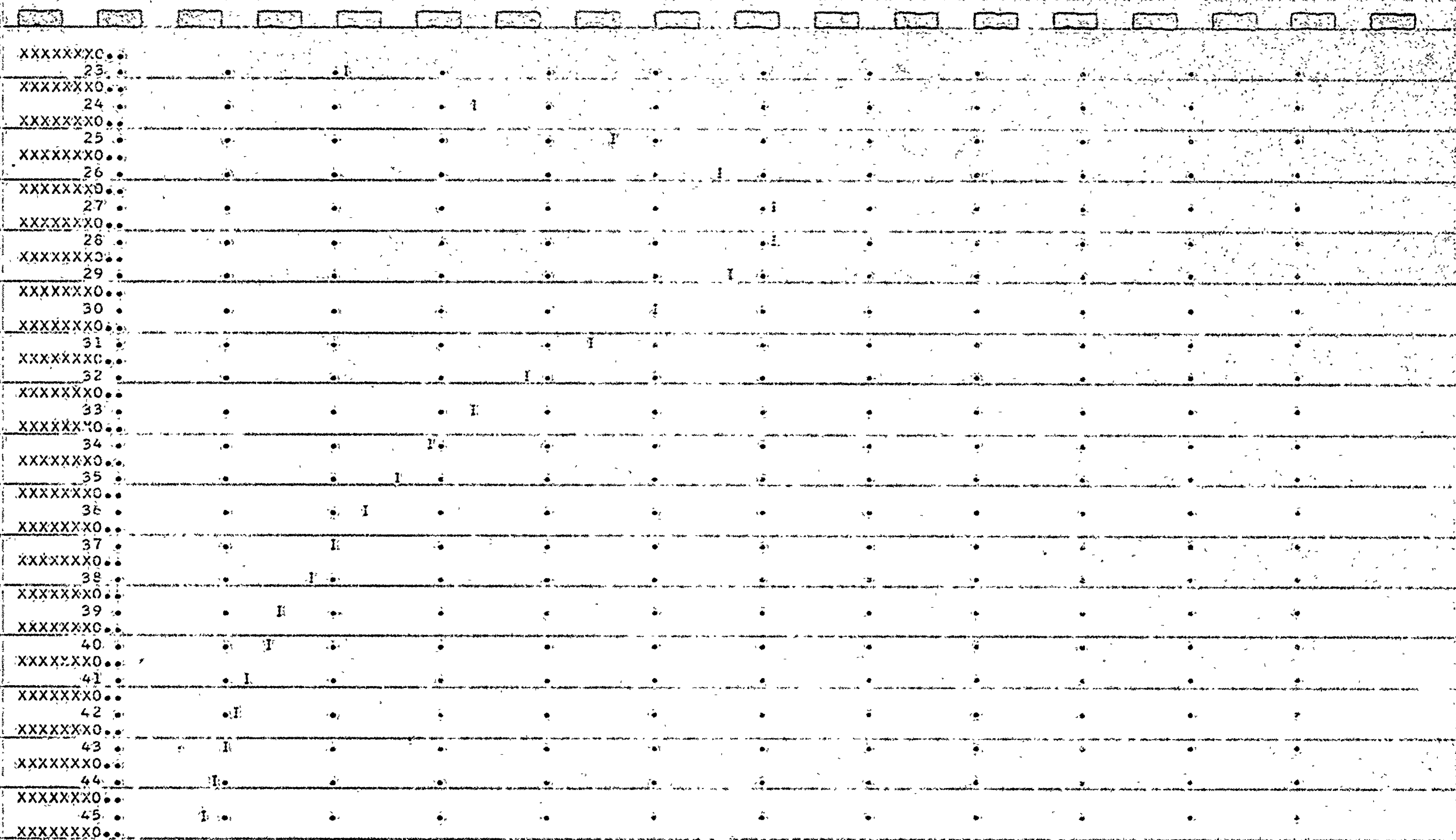
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OVN

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HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
3	1	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
2	0	0	1.500	0.300	0.0	[illegible]

ROUTED FLOWS AT 3

901.	898.	883.	859.	837.	815.	794.	773.	753.	734.
715.	696.	679.	703.	934.	1593.	2692.	3987.	5162.	6025.
6790.	8411.	12715.	21134.	32962.	45515.	55614.	60895.	60819.	56653.
50366.	43789.	38057.	33306.	29248.	25746.	22672.	19958.	17570.	15513.
13816.	12434.	11225.	10126.	9147.					

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	60895.	60857.	51465.	29488.	745928.
INCHES		1.15	3.90	6.70	7.07
AC-FT		30192.	102132.	175554.	185036.

```
*OVF*
                                   STATION    3

                         INFLOW I , OUTFLOW O  AND OBSERVED FLOW *
          0.    10000.    20000.    30000.    40000.    50000.    60000.    70000.        0.        0.        0.        0.
  *       0.
          1  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
          2  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
          3  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
          4  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
          5  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
          6  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
          7  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
          8  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
          9  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
         10  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
         11  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
         12  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
         13  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
         14  .I       .         .         .         .         .         .         .         .         .         .         .
  *       0..
         15  .OI      .         .         .         .         .         .         .         .         .         .         .
  *       0..
         16  .  OI    .         .         .         .         .         .         .         .         .         .         .
  *       0..
         17  .   OI   .         .         .         .         .         .         .         .         .         .         .
  *       0..
         18  .    OI  .         .         .         .         .         .         .         .         .         .         .
  *       0..
         19  .     OI .         .         .         .         .         .         .         .         .         .         .
  *       0..
         20  .      OI.         .         .         .         .         .         .         .         .         .         .
  *       0..
         21  .       OI.        .         .         .         .         .         .         .         .         .         .
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         22  .        O . I     .         .         .         .         .         .         .         .         .         .
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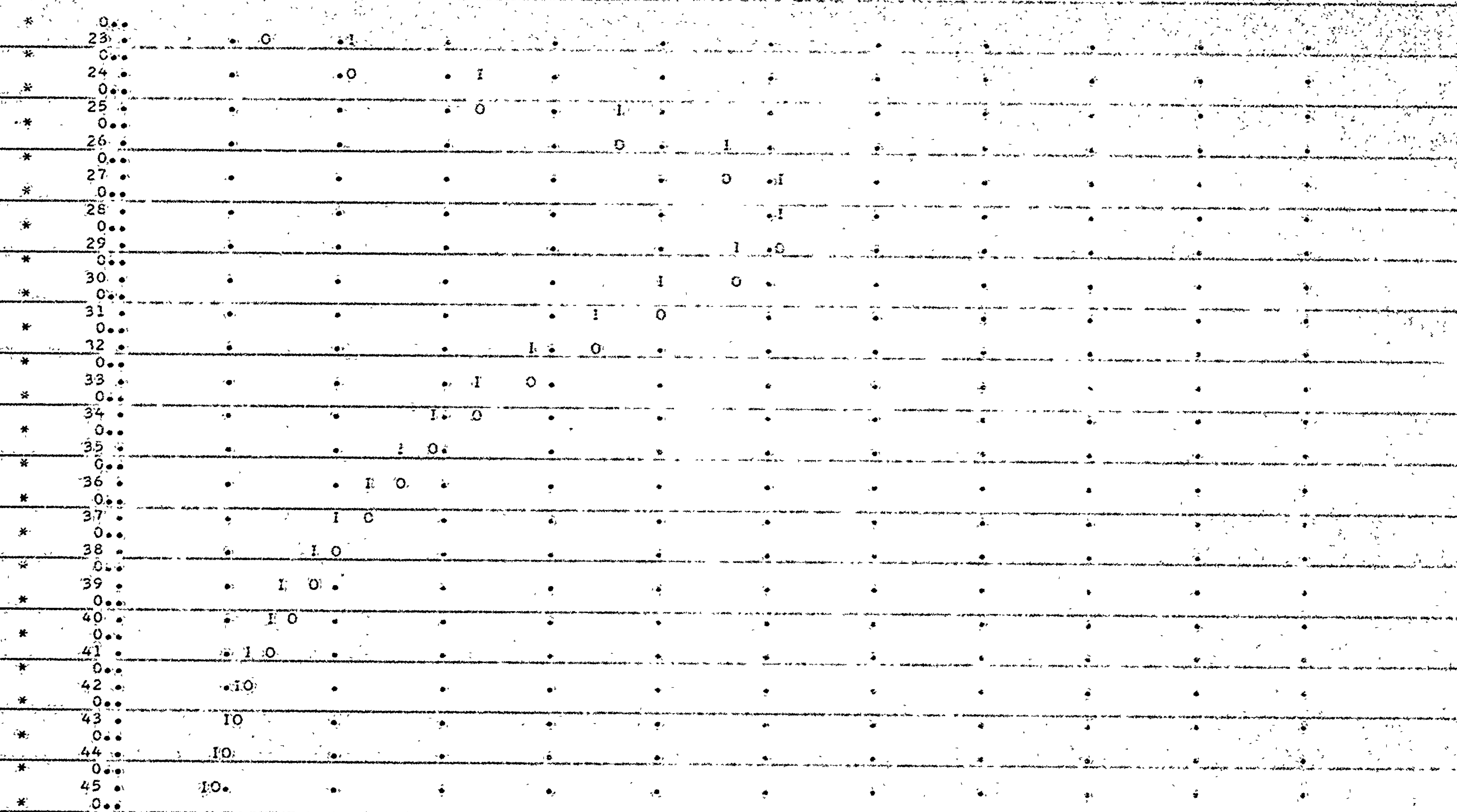
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*OVN*

     **********      **********      **********      **********      **********

                         SUB-AREA RUNOFF COMPUTATION

          SUBAREA 47
                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME
                       3       0       0       0       0       0       1

                                   HYDROGRAPH DATA
          IHYDG   IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISAOW   ISAME   LOCAL
              1      0  564.00     0.0 1055.00     0.0     0.0       0       0       0

                                     PRECIP DATA
                  SPFE     PMS      R6     R12     R24     R48     R72     R96
                 10.80     0.0     0.0     0.0     0.0     0.0     0.0     0.0
 TRSPC COMPUTED BY THE PROGRAM IS 0.917

                                      LOSS DATA
          STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
            0.0     0.0    1.00     0.0     0.0    1.00    1.00    0.07     0.0     0.0

                                UNIT HYDROGRAPH DATA
                           TC  24.20      R  14.70    NTA    0

                                   RECESSION DATA
                       STRTQ  1200.00    QRCSN  7650.00    RTIOR  1.30

         UNIT HYDROGRAPH 31 END-OF-PERIOD ORDINATES, LAG  20.62 HOURS, CP  0.71  VOL  1.00
        693.     2525.     4966.     7630.    10182.    11872.    12632.    12340.    10818.     8827.
       7192.     5860.     4775.     3891.     3170.     2583.     2105.     1715.     1397.     1139.
        928.      756.      616.      502.      409.      333.      272.      221.      180.      147.
        120.

                                END-OF-PERIOD FLOW
                          TIME    RAIN    EXCS    COMP Q
                             1    0.01    0.00    1169.
                             2    0.01    0.00    1137.
                             3    0.02    0.00    1109.
                             4    0.02    0.00    1080.
                             5    0.09    0.00    1052.
                             6    0.16    0.00    1025.
                             7    0.01    0.00     999.
                             8    0.01    0.00     973.
                             9    0.03    0.00     948.
                            10    0.03    0.00     923.
                            11    0.09    0.00     899.
```

12	0.09	0.00	516.
13	0.38	0.10	853.
14	0.73	0.54	1206.
15	0.96	0.00	2175.
16	0.66	0.00	3476.
17	0.16	0.00	4598.
18	0.16	0.00	6277.
19	0.49	0.26	7323.
20	0.49	0.26	8359.
21	2.02	1.79	10594.
22	4.09	3.87	17266.
23	0.29	0.07	[illegible]
24	0.29	0.07	[illegible]
25	0.01	0.00	55441.
26	0.01	[illegible]	71084.
27	0.04	0.00	78594.
28	0.04	0.00	79967.
29	0.15	0.00	74992.
30	0.30	[illegible]	64560.
31	0.02	[illegible]	[illegible]
32	0.02	0.00	[illegible]
33	0.0	0.0	35903.
34	0.0	0.0	29658.
35	0.0	0.0	24509.
36	0.0	0.0	20776.
37	0.0	0.0	16754.
38	0.0	0.0	[illegible]
39	0.0	0.0	11322.
40	0.0	0.0	9278.
41	0.0	0.0	7627.
42	0.0	0.0	7437.
43	0.0	0.0	7215.
44	0.0	0.0	7028.
45	0.0	0.0	6846.
SUM	10.45	6.94	[illegible]

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	79967.	79281.	65544.	34021.	866655.
INCHES		1.31	4.32	6.73	7.16
AC-FT		39333.	130071.	202546.	215475.

```
*OVF*
                                        STATION    3

                        INFLOW I , OUTFLOW O  AND OBSERVED FLOW *
       0.   10000.   20000.   30000.   40000.   50000.   60000.   70000.   80000.        0.        0.        0.
 XXXXXXXO.
                                                                                         PRECIP L  AND EXC
 ESS X
       0.        0.        0.        0.        0.        0.        0.        0.        0.        6.        4.        2.
 ESS X XO.
       1 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XO.L
       2 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XO.L
       3 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XO.L
       4 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XO.L
       5 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XO.L
       6 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XOLX
       7 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XOLL
       8 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XOLL
       9 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XOLL
      10 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XOLL
      11 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XOLL
      12 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XOLL
      13 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS X XLLX
      14 .I       .        .        .        .        .        .        .        .        .        .        .
 ESS XLXXXX
      15 .  I     .        .        .        .        .        .        .        .        .        .        .
 ESS XLXXXL
      16 .   I    .        .        .        .        .        .        .        .        .        .        .
 ESS XLXXXL
      17 .     I  .        .        .        .        .        .        .        .        .        .        .
 ESS XLXXLX
      18 .      I .        .        .        .        .        .        .        .        .        .        .
 ESS XLXXLX
      19 .       I.        .        .        .        .        .        .        .        .        .        .
 ESS XLXLXX
      20 .        I.       .        .        .        .        .        .        .        .        .        .
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ESS XLXLXX
         21 .      .I        .         .         .         .         .         .         .         .         .         L
 XXXXXXXXXX
         22 .      .      I  .         .         .         .         .         .         .         .         LXXXXXXXXXX
 XXXXXXXXXX
         23 .      .         .        I.         .         .         .         .         .         .         .
 XXXXXXXXLX
         24 .      .         .         .         .  I      .         .         .         .         .         .
 XXXXXXXXLX
         25 .      .         .         .         .         .       I .         .         .         .         .
 XXXXXXXXLL
         26 .      .         .         .         .         .         .I        .         .         .         .
 XXXXXXXXLL
         27 .      .         .         .         .         .         .        I.         .         .         .
 XXXXXXXXLL
         28 .      .         .         .         .         .         .         I         .         .         .
 XXXXXXXXLL
         29 .      .         .         .         .         .         .    I    .         .         .         .
 XXXXXXXXLX
         30 .      .         .         .         .         .    I    .         .         .         .         .
 XXXXXXXLLX
         31 .      .         .         .         .  I      .         .         .         .         .         .
 XXXXXXXLLL
         32 .      .         .         .         .   I     .         .         .         .         .         .
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         33 .      .         .         .     I   .         .         .         .         .         .         .
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         34 .      .         .         I         .         .         .         .         .         .         .
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         35 .      .         .    I    .         .         .         .         .         .         .         .
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         36 .      .         I         .         .         .         .         .         .         .         .
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         37 .      .      I  .         .         .         .         .         .         .         .         .
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         38 .      .   I     .         .         .         .         .         .         .         .         .
 XXXXXXXLLL
         39 .      .I        .         .         .         .         .         .         .         .         .
 XXXXXXXLLL
         40 .     I.         .         .         .         .         .         .         .         .         .
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         41 .    I .         .         .         .         .         .         .         .         .         .
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         42 .   I  .         .         .         .         .         .         .         .         .         .
 XXXXXXXLLL
         43 .   I  .         .         .         .         .         .         .         .         .         .
 XXXXXXXLLL
         44 .   I  .         .         .         .         .         .         .         .         .         .
 XXXXXXXLLL
         45 .   I  .         .         .         .         .         .         .         .         .         .
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OVN

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COMBINE HYDROGRAPHS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
3	2	0	0	0	0	0

SUM OF 2 HYDROGRAPHS AT 3

2070.	2036.	1992.	1939.	1889.	1840.	1792.	1746.	1701.	1657.
1614.	1572.	1533.	1909.	3110.	5070.	7591.	10214.	12509.	14427.
17384.	25477.	41556.	64584.	91403.	116600.	134208.	140362.	135811.	121219.
103453.	87409.	73971.	62944.	53757.	46021.	39425.	33741.	28872.	24790.
21443.	19841.	18441.	17155.	15993.					

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	140362.	138336.	116371.	65348.	1614557.
INCHES		1.22	4.10	2.79	7.12
AC-FT		68632.	230937.	377141.	400510.

```
*OVF*
                                          STATION    3

                         INFLOW I , OUTFLOW O  AND OBSERVED FLOW *
        0.     20000.    40000.    60000.    80000.   100000.   120000.   140000.   160000.      0.        0.        0.
XXXXXXXO.
       1 .I        .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
       2 .I        .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
       3 .I        .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
       4 .I        .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
       5 .I        .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
       6 .I        .         .         .         .         .         .         .         .         .         .
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       7 .I        .         .         .         .         .         .         .         .         .         .
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      15 . I       .         .         .         .         .         .         .         .         .         .
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      16 .  I      .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
      17 .   I     .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
      18 .    I    .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
      19 .      I  .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
      20 .       I .         .         .         .         .         .         .         .         .         .
XXXXXXXO..
      21 .         I.        .         .         .         .         .         .         .         .         .
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      22 .         .  I      .         .         .         .         .         .         .         .         .
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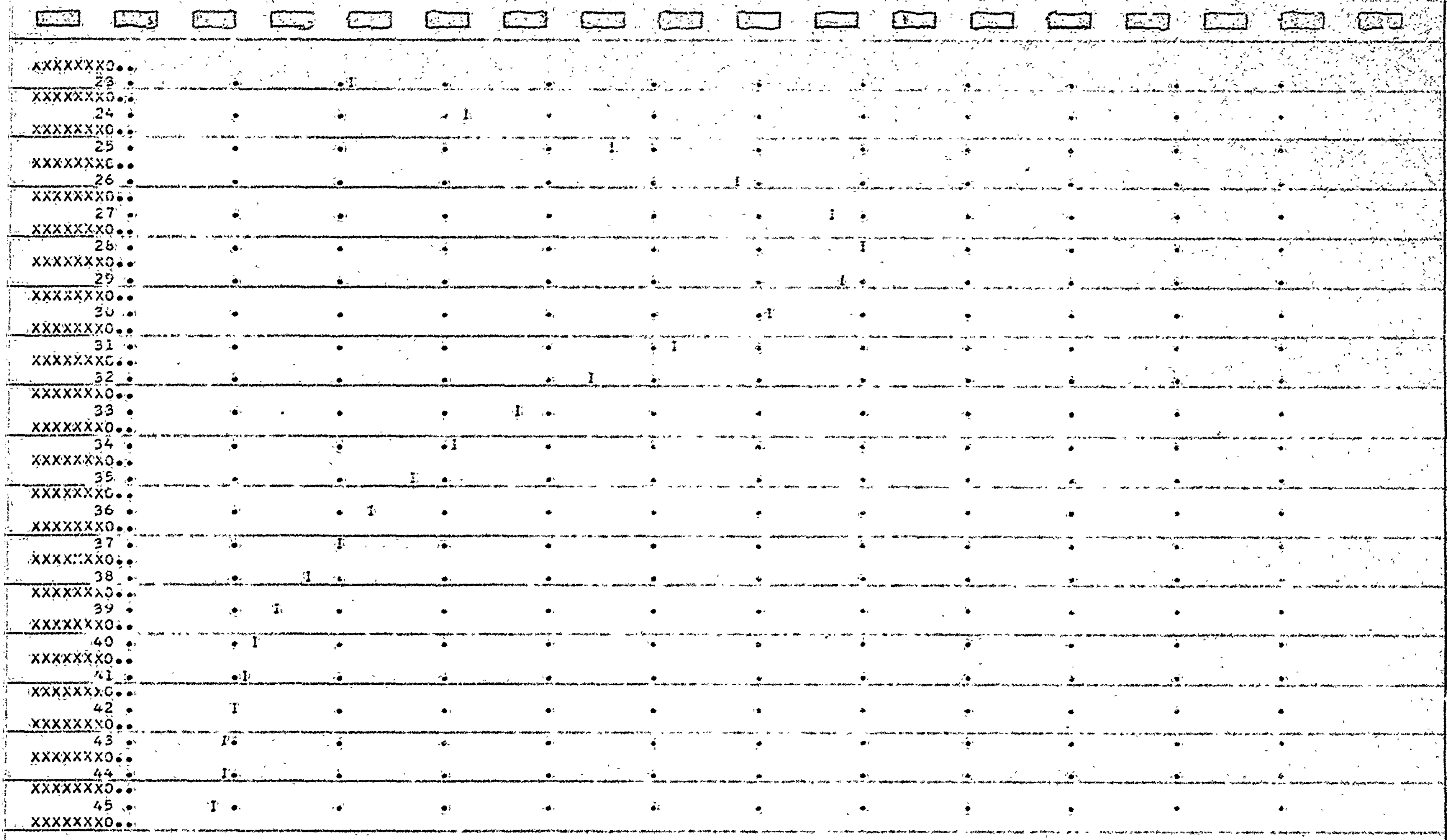
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HYDROGRAPH ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
4	1	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	-1.

STORAGE	0.	76446.	154716.	207510.	261872.	316354.	371315.	426754.	510808.	595939.
OUTFLOW	0.	7940.	23150.	35970.	50570.	74720.	91160.	108800.	137350.	168230.

TIME	EOP STOR	AVG IN	EOP OUT
1	19930.	2070.	237[illegible].
2	19925.	2053.	2070.
3	19912.	2014.	2063.
4	19887.	1966.	2064.
5	19850.	1914.	2062.
6	19801.	1865.	2057.
7	19743.	1816.	2051.
8	19674.	1769.	2043.
9	19595.	1723.	2035.
10	19503.	1679.	2026.
11	19412.	1631.	2016.
12	19309.	1593.	2006.
13	19198.	1552.	1994.
14	19131.	1721.	1987.
15	19259.	2510.	2000.
16	19771.	4090.	2053.
17	20817.	6330.	2162.
18	22467.	8902.	2334.
19	24676.	11357.	2563.
20	27344.	13464.	2840.
21	30543.	15906.	3172.
22	35012.	21430.	3636.
23	42326.	32516.	4396.
24	54240.	53070.	5634.
25	71953.	77993.	7473.
26	95372.	104001.	11618.
27	122919.	123404.	16971.
28	152108.	137535.	22543.
29	179975.	138336.	29238.
30	202875.	125515.	34998.

31	222442.	112386.	39932.
32	235763.	95431.	42503.
33	244683.	80690.	45519.
34	250089.	68457.	47382.
35	252720.	58313.	46034.
36	253151.	49889.	44210.
37	251835.	42724.	47954.
38	249131.	36564.	47123.
39	245837.	31307.	46096.
40	240716.	26831.	44846.
41	235603.	23117.	43436.
42	230035.	20642.	41956.
43	224552.	19141.	40475.
44	219122.	17795.	39003.
45	212741.	16574.	37546.
SUM			843631.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	48210.	48152.	46942.	33249.	843631.
INCHES		0.42	1.66	3.52	3.72
AC-FT		23889.	93153.	197942.	209273.

OVF

STATION 4

```
                              INFLOW I , OUTFLOW O  AND OBSERVED FLOW *
        0.    20000.    40000.    60000.    80000.   100000.   120000.   140000.        0.        0.        0.        0.
 XXXXXXXO.
        1 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
        2 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
        3 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
        4 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
        5 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
        6 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
        7 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
        8 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
        9 .I       .         .         .         .         .         .         .         .         .         .         .
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       10 .I       .         .         .         .         .         .         .         .         .         .         .
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       11 .I       .         .         .         .         .         .         .         .         .         .         .
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       12 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       13 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       14 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       15 .I       .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       16 .OI      .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       17 .O I     .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       18 .O  I    .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       19 .O    I  .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       20 .O     I .         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       21 . O     I.         .         .         .         .         .         .         .         .         .         .
 XXXXXXXO..
       22 . O      .I        .         .         .         .         .         .         .         .         .         .
```

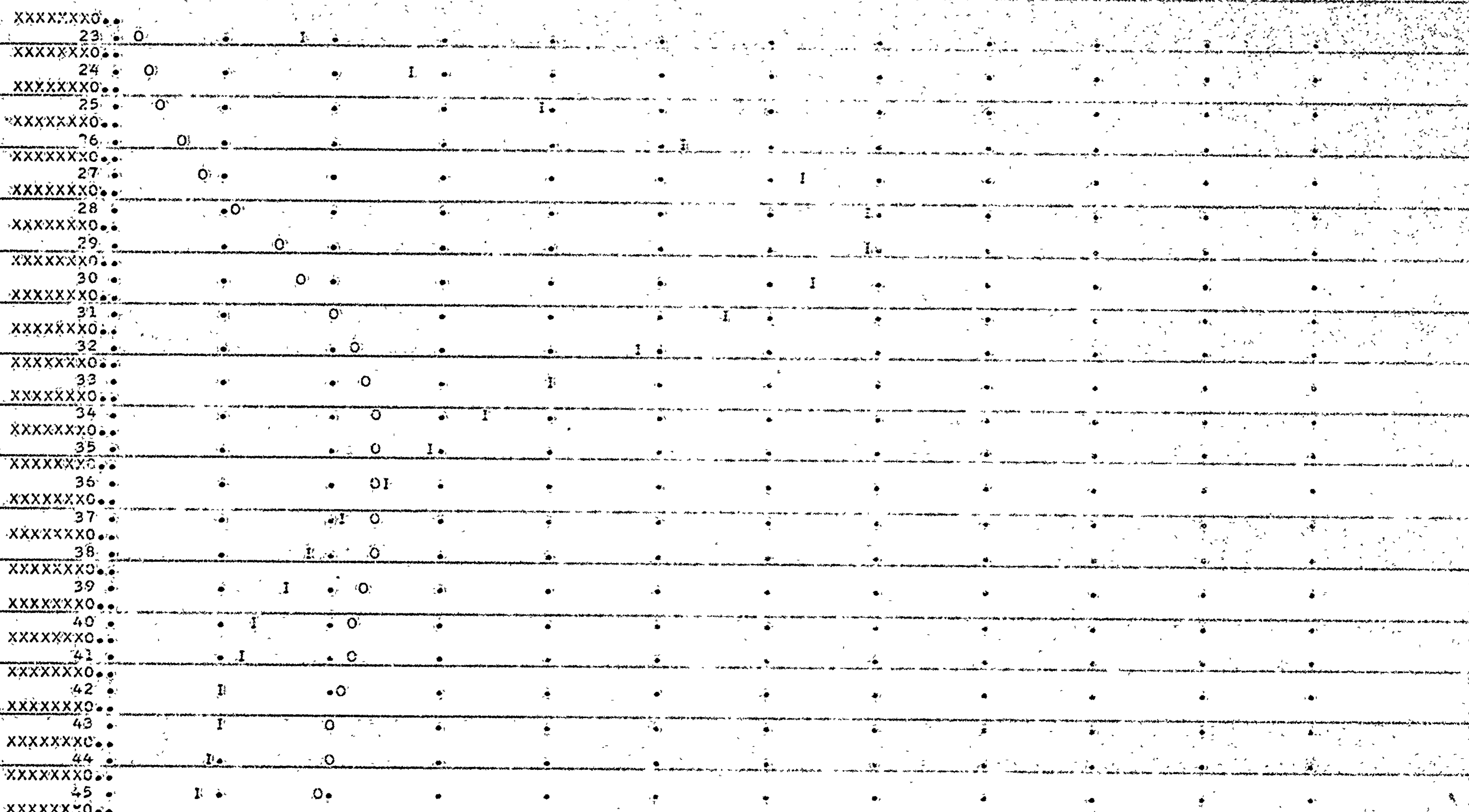
XXXXXXXO
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XXXXXXXO

RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	23514.	23096.	17278.	8059.	114.00
ROUTED TO	2	23130.	22907.	17180.	8057.	114.00
HYDROGRAPH AT	2	40667.	40526.	35175.	21669.	377.00
2 COMBINED	2	61436.	61279.	51679.	29510.	441.00
ROUTED TO	3	60899.	60857.	51465.	29488.	491.00
HYDROGRAPH AT	3	79967.	79281.	65544.	34021.	564.00
2 COMBINED	3	140862.	138338.	116371.	63348.	1055.00
ROUTED TO	4	48210.	48152.	43941.	33248.	1055.00

APPENDIX C

PHOTOGRAPHS

Photograph Index

1. Upstream slope from left abutment.

2. Downstream slope and left abutment. Note control and intake buildings, emergency spillway weir, and power house.

3. Emergency spillway approach channel and weir looking upstream.

4. Emergency spillway approach channel weir and powerhouse.

5. Outled end of Three 8 foot diameter outlet pipes and two siphons.

6. Downstream channel - tail water of Lake Luzerne.

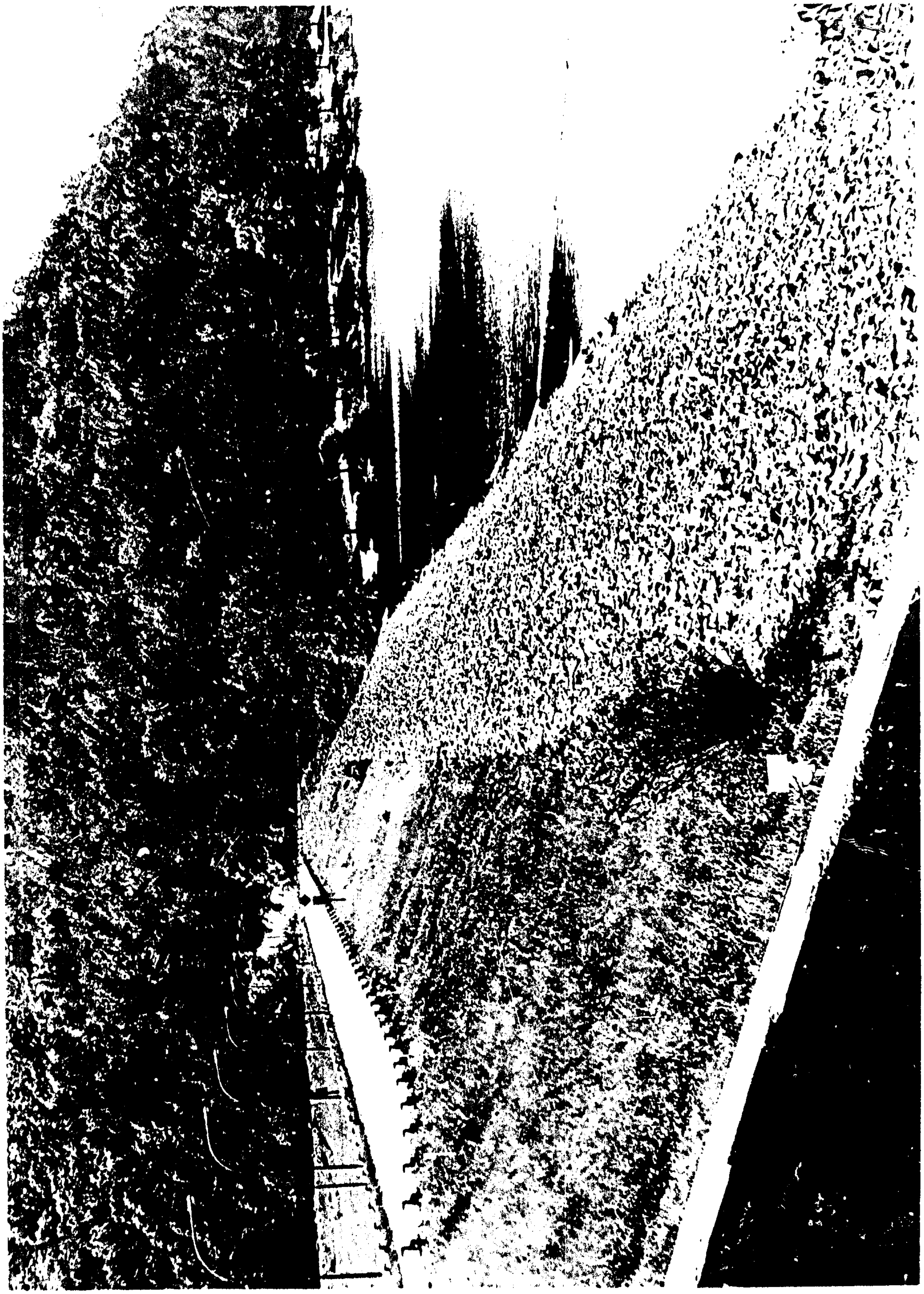


PLATE 1

PLATE 2

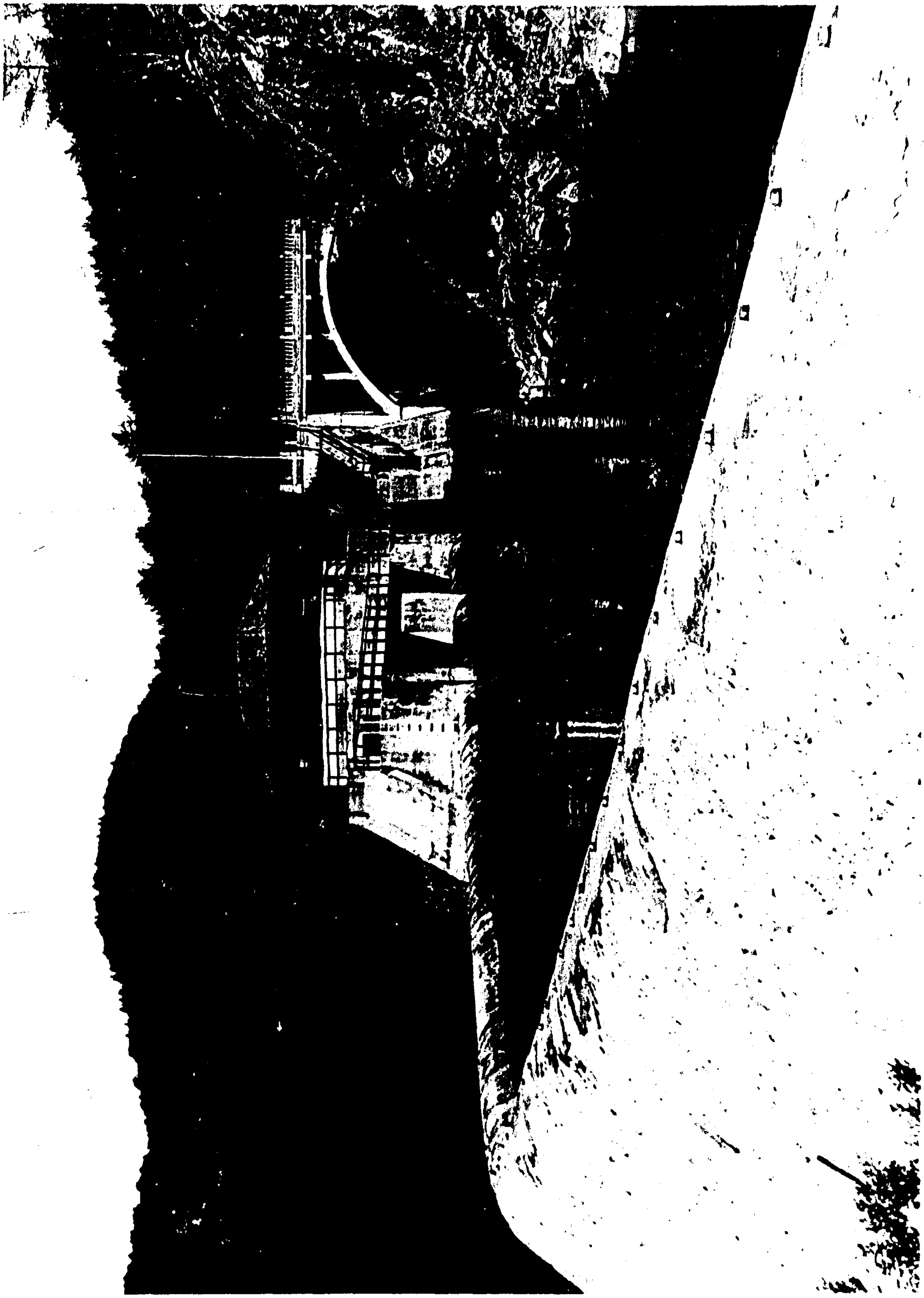


PLATE 3

PLATE 5

PLATE 6

APPENDIX D

PERTINENT CORRESPONDENCE AND REPORTS

Form No. 9. 6-16-20-500 (20-6170)

STATE OF NEW YORK—HUDSON RIVER REGULATING DISTRICT

SUBJECT: Sacandaga Spillway [illegible]

FILE NO.

ACC. NO. 1

SHEET

WORK BY [illegible] Sept. 1927 CHECKED BY ______ 19__

MADE IN CONNECTION WITH

REFERENCE — CONT'D FROM ACC.

Assume [illegible] 15' [illegible] $y = 27'$ — $V = 41.6$ ft per sec for 27' hd

For $x = 20$

$$y = \left(41.6 \times [illegible] \times \frac{2}{41.6 \times [illegible]}\right) + 16.08\left(\frac{2}{41.6 \times [illegible]}\right)^2$$

$$= \left(41.6 \times .557 \times \frac{2}{41.6 \times .829}\right) + 16.08\left(\frac{2}{41.6 \times .829}\right)^2$$

$$= (22.1 \times 0.58) + (16.08 \times .058^2)$$

$$= 1.317 + .05 = 1.367'$$

For $x = 40$

$$y = 22.1 \times \frac{4}{41.6 \times .829} + 16.08\left(\frac{4}{41.6 \times .829}\right)^2$$

$$22.1 \times .116 + (16.08 \times .116^2) = 2.846$$

For $x = 60$

$$y = \left(22.1 \times \frac{6}{34.5}\right) + 16.08\left(\frac{6}{34.5}\right)^2$$

$$(22.1 \times .174) + (16.08 \times .174^2) = 3.85 + .49 = 4.34'$$

For $x = 80$

$$y = \left(22.1 \times \frac{8}{34.5}\right) + 16.08\left(\frac{8}{34.5}\right)^2$$

$$(22.1 \times .232) + 16.08(.232^2) = 5.26 + .865 = 6.13'$$

Assume [illegible] [illegible] [illegible] = 25.0 ft per second.

Then for $x = 80$

$$y = \left([illegible] \times \frac{8}{25 \times .829}\right) + 16.08\left(\frac{8}{25 \times .829}\right)^2$$

$$= (13.71 \times .387) + (16.08 \times .387^2) =$$

$$5.31 + 2.40 = 7.71$$

Form No. 9.

STATE OF NEW YORK—HUDSON RIVER REGULATING DISTRICT

SUBJECT: Sifton Spillway — FILE NO.

ACC. NO.

SHEET 1

WORK BY [illegible] Sept 1927 — CHECKED BY .... 19....

MADE IN CONNECTION WITH

REFERENCE — CONT'D FROM ACC.

Path of Water after leaving lip in spillway

Vertical disp = $(V \sin\theta\, t) + \frac{1}{2} g t^2)$

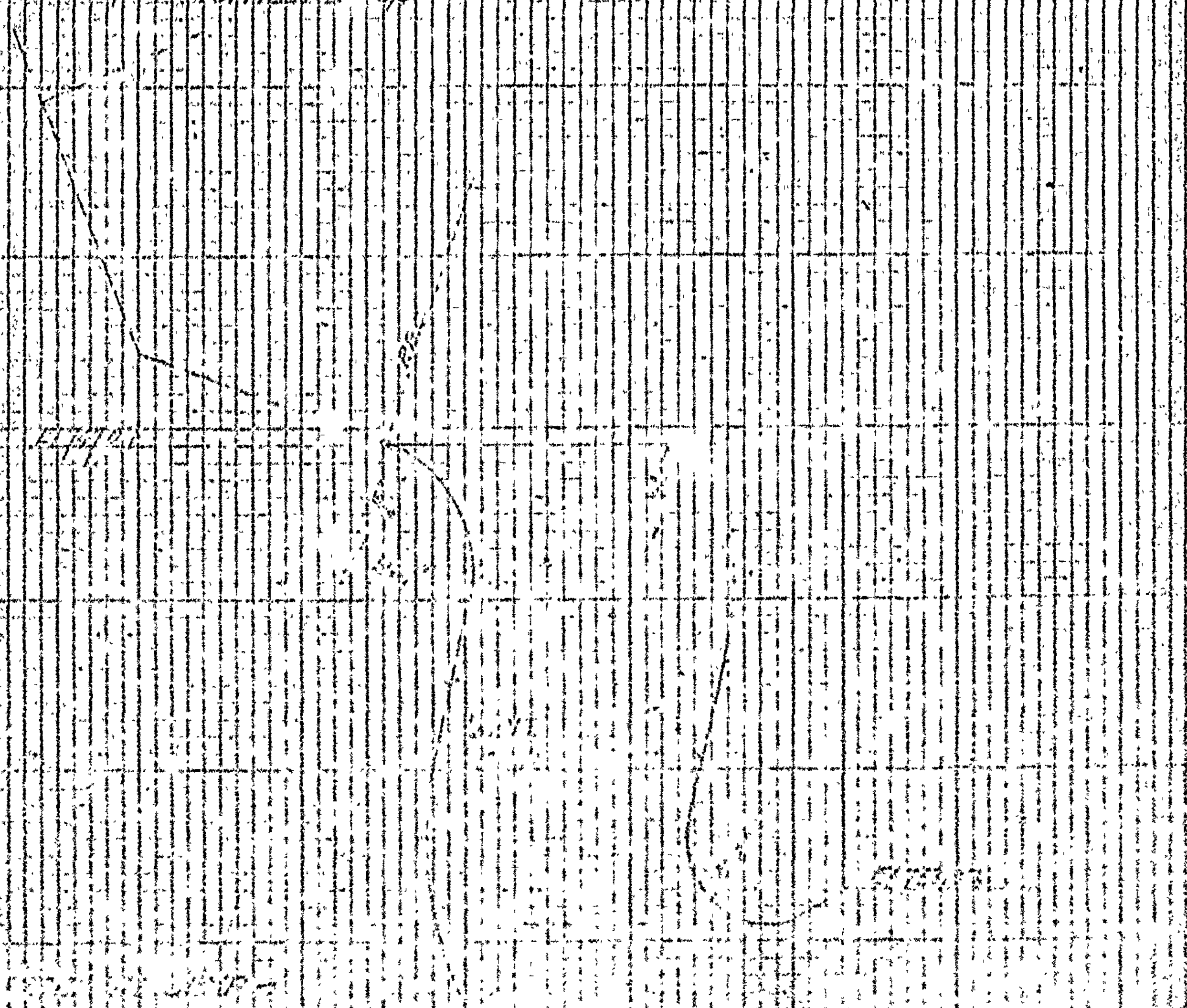
V = Velocity in feet per second

θ = angle which tangent to curve at point where water leaves makes with horizontal

t = time in secs. = $\dfrac{\text{horizontal distance}}{\text{hor. component of velocity}} = \dfrac{X}{V \cos\theta}$

X = Horizontal distance

Y = Vertical drop



BOARD OF HUDSON RIVER REGULATING DISTRICT
11 NORTH PEARL STREET
ALBANY 7, N. Y.
TELEPHONE: [illegible]

Filed 5-6-47

File

Hadley, N.Y.
May 1, 1947.

Mr. E. H. Sargent, Chief Engineer,
Hudson River Regulating District,
11 North Pearl St.,
Albany, N.Y.

Dear Mr. Sargent:

I have made the annual measurement of the settlement of the Conklingville Dam this morning with the following results.

ELEVATION OF SETTLEMENT PIPES AT CONKLINGVILLE DAM

Date	105 - 00 17.15' Left	105 - 00 17.94' Right	109 - 00 15.48' Left	109 - 00 17.23' Right	Remarks
5/21/30	794.91	794.83	794.77	794.90	Original Elev.
5/1/46	794.16	793.99	793.93	793.86	Last year
5/1/47	794.16	793.99	793.90	793.85	This year

ELEVATION DIFFERENCES

	0.00	0.00	0.02	0.01	Last year
	0.75	0.84	0.87	1.05	Total to date

Average settlement to date 0.87[illegible] Feet.

Very truly yours,

R. B. Davidson

Senior Assistant Engineer.

BOARD OF HUDSON RIVER REGULATING DISTRICT
11 NORTH PEARL STREET
ALBANY, N.Y.
TELEPHONE: 4-3491

7 l

Hadley, N.Y.
May 1, 1945.

Mr. E. H. Sargent, Chief Engineer,
Hudson River Regulating District,
11 North Pearl St.,
Albany, N.Y.

Dear Mr. Sargent:

I have made the annual measurement of the settlement of the Conklingville Dam th s morning with the following results.

ELEVATION OF SETTLEMENT PIPES AT CONKLINGVILLE DAM.

Date	105 - 00 17.15' Left	17.94' Right	109 + 00 15.42' Left	17.28' Right	Remarks
5/21/30	794.91	794.83	794.77	794.90	Original Elev.
5/ 2/44	794.18	794.00	793.94	793.89	Last year
5/ 1/45	794.17	794.0	793.93	793.88	This year

ELEVATION DIFFERENCES

0.01	0.005	0.015	0.01	Last year
0.74	0.83	0.84	1.02	Total to date

Average settlement to date 0.86 feet.

Very truly yours,
R. B. Davidson
Assistant Engineer.

BOARD OF HUDSON RIVER REGULATING DISTRICT
11 NORTH PEARL STREET
ALBANY, N. Y.
TELEPHONES 4-2628 / 3-4628

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WILLIAM E. FITZSIMMONS
THOMAS MILLER
Members of the Board

JOHN J. MURPHY
Secretary-Treasurer
EDWARD H. SARGENT
Chief Engineer
ROSCOE IRWIN
Counsel

Hadley, N.Y.
May 8, 1942.

Mr. E. H. Sargent, Chief Engineer,
Hudson River Regulating District,
11 North Pearl St.,
Albany, N.Y.

Dear Mr. Sargent:

I made the annual measurement of the settlement of the Conklingville Dam this afternoon with the following results.

ELEVATION OF SETTLEMENT PIPES AT CONKLINGVILLE DAM.

Date	105-00 17.15' Left	105-00 17.94' Right	109-00 15.42' Left	109-00 17.28' Right	Remarks
5/21/30	794.91	794.83	794.77	794.90	Original El.
5/1/41	794.21	794.06	794.00	793.95	Last year
5/8/42	794.21	794.04	793.99	793.94	This year

ELEVATION DIFFERENCES

0.00	0.02	0.01	0.01	Last year
0.70	0.79	0.78	0.96	Total to date

Average settlement to date 0.81 feet.

Very truly yours,

R. B. Davidson

Assistant Engineer.

BOARD OF HUDSON RIVER REGULATING DISTRICT

11 NORTH PEARL STREET
ALBANY, N. Y.
TELEPHONES { 4-2625 / 3-4623

Hadley, N.Y.
May 1, 1941.

Mr. E. H. Sargent, Chief Engineer,
Hudson River Regulating District,
11 North Pearl St.,
Albany, N.Y.

Dear Mr. Sargent:

I made the annual measurement of the settlement of the Conklingville Dam this morning with the following results.

ELEVATION OF SETTLEMENT PIPES AT CONKLINGVILLE DAM.

Date	105-00 17.15' Left	105-00 17.94' Right	109-00 15.42' Left	109-00 17.28' Right	Remarks
5/21/30	794.91	794.83	794.77	794.90	Original El.
5/2/40	794.23	794.06	794.02	793.97	Last year
5/1/41	794.21	794.06	794.00	793.93	This year
ELEVATION DIFFERENCES					
	0.02	0.00	0.02	0.02	Last year
	0.70	0.77	0.77	0.95	Total to date

Average settlement to date 0.80 feet.

Very truly yours,

R. B. Davidson

Assistant Engineer.

BOARD OF HUDSON RIVER REGULATING DISTRICT

11 NORTH PEARL STREET

ALBANY, N. Y.

TELEPHONES { 4-2628 / 3-4623

FIELD OFFICE
~~XXXXXXXXXXXX~~

Conklingville, N.Y.
August 2, 1938.

Mr. E. H. Sargent, Chief Engineer,
Hudson River Regulating District,
11 North Pearl St.,
Albany, N.Y.

Dear Mr. Sargent:

Enclosed, please find two pictures forming a panorama of the Conklingville Dam Spillway and showing the normal seepage during the month of May.

Water in the reservoir at this time varied from Elevation 764.45 on May 1 to Elevation 766.[illegible] on June 1.

1 Shows seepage between west concrete wall of logway and underlying rock El. 751 approx.

2 Shows seepage through and under the stop logs in the logway El. 756.0

3 Shows seepage through rock seams at Sta. 10+50 El. 743 approx.

4 Shows seepage through rock seams at Sta. 11+10 El. 751 approx.

5 Shows seepage through construction joint in spillway concrete at Sta. 11+86.5 El. 754.0

6 Shows seepage through construction joint in spillway concrete at Sta. [illegible] El. 759.4

7 Shows seepage from weep pipe at Sta. 11+99 El. 758.3
Flow estimated at 1 gal. per min.

8 Shows seepage from rock seam at Sta. 12+00 El. 756.8

9 Shows seepage from weep pipe at El. 754.5 Flow = 1 gal. per min.

10 Shows seepage from weep pipe at El. [illegible] Flow = [illegible] gal. per min.

11 Shows seepage from weep pipe at El. 733.8 Flow - 2 gal. per min.

12 Shows seepage from Ice Chute between and under stop logs at El. 735.0 Flow estimated at 6 gal.per min.

Very truly yours,

R. B. Davidson

Assistant Engineer.

Dr.

BOARD OF HUDSON RIVER REGULATING DISTRICT
44 HOWARD STREET
ALBANY, N. Y.
TELEPHONES 3-1291 / 4-2625

HENRY M. SAGE, PRESIDENT
W. ELLISON MILLS
DAVID J. FITZGERALD, Jr.

G. WILLIAM McEWAN
Secretary-Treasurer
EDWARD H. SARGENT
Chief Engineer

Field Office
Sacandaga Reservoir
Conklingville, N. Y.
Post Office
Hadley, New York.

December 2, 1930.

Mr. E. H. Sargent Chief Engineer
Hudson River Regulating District
44 Howard St.
Albany, N.Y.

Dear Sir:

Following is a record of the elevations of the settlement pipes in the Conklingville Dam to date.

Date	Elevations 105+0 Left A	Right B	100+0 Left C	Right D
May 21, 1930 5/21/30	794.91	794.83	794.77	794.90
June 6/12/30	794.71	794.60	794.62	794.62
July 7/16/30	794.66	794.54	794.58	794.57
Dec. 12/2/30	794.56	794.46	794.49	794.49

Days Difference	Settlement Elev. diff. between observations				Average
22	0.20	0.23	0.15	0.28	0.22
34	0.05	0.06	0.04	0.05	0.05
139	0.10	0.08	0.09	0.09	0.09

Depth of fill at 105+0 Left A 90'
Depth of fill at 105+0 right B 91'
Depth of fill at 100+0 left C 114'
Depth of fill at 100+0 right D 115'

Very truly yours,

W. P. Davidson

BOARD OF HUDSON RIVER REGULATING DISTRICT
11 NORTH PEARL STREET
ALBANY, N. Y.
TELEPHONES { 4-2025 / 3-4623

JAMES C. McDONALD
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Member of the Board.

JOHN J. MURPHY
Secretary-Treasurer
EDWARD H. SARGENT
Chief Engineer
ROSCOE IRWIN
Counsel

Conklingville, N.Y.
April 12, 1933.

Mr. L. B. Westfall Office Engineer
Hudson River Regulating District
11 North Pearl St.
Albany, N.Y.

Dear Mr. Westfall:

Enclosed, herewith, is the information requested by you on April 10 in regard to the Asphalt Grouting at the Conklingville Dam.

Sheet 1 was taken from the log of the well holes as driven on the center line of the dam and shows the total depths of holes below the ground surface at the time of drilling and the depths to the various seams encountered.

Sheet 2, the blueprint, is a profile on the center line of the dam showing the well holes as driven and the seams encountered. LW indicates drill water lost from hole. FW indicates ground water entering the drill hole. The pencil line shows the bottom of the cut off trench as excavated into the ledge.

Sheet 3 is a record of the quantity and grade of asphalt and pressures used in the deep well holes on the center line of the dam from information furnished by the American Asphalt Grouting Co.

Sheet 4 is taken from the field notes locating the jackhammer holes drilled for surface treatment with asphalt grout.

Sheet 5 shows the location of the field notes on sheet 4 and the numbering of the jackhammer holes.

Sheet 6 shows the approximate location of the jackhammer holes within the area under the bridge abutment concrete. I could find no field location notes for these but know they were spotted for drilling very close to where shown subject to some slight variation due to difficulty of starting the drill steel at the point indicated.

Sheet 7 is a copy of the reports turned in by the American Asphalt Grouting Co. operator on the surface grouting. I found from my own records that 16 holes were grouted inside the bridge abutment form and 29 holes between the form and the water in the canal which checks both the operator's record and the field location of the holes.

BOARD OF HUDSON RIVER REGULATING DISTRICT
11 NORTH PEARL STREET
ALBANY, N. Y.
TELEPHONES { 4-2625 / 3-4523

JAMES C. McDONALD
J. WARD RUSSELL
Members of the Board

JOSIAH H. DANFORTH,
Member of the Board.

JOHN J. MURPHY
Secretary-Treasurer
EDWARD H. SARGENT
Chief Engineer
ROSCOE IRWIN
Counsel

If this does not cover the information you need, let me know as I have most of the correspondence concerning the job here as well as the proposal for the work and the cost of the asphalt.

Very truly yours,

T. B. Davidson

Assistant Engineer

✓ Paid 11/4/33
(Box 80)

STATE OF NEW YORK—HUDSON RIVER REGULATING DISTRICT

SUBJECT Record of Asphalt Grouting Done on Conklingville Dam by American Asphalt Grouting Co., Chattanooga, Tenn.

FILE

ACC. NO.

SHEET 3

19

COMPUTER 19 CHECKED BY

MADE IN CONNECTION WITH

REFERENCE

CONT'D FROM ACC.

Hole No.	Total Depth	Depth Grouted (Measured from bottom)	Soft Asphalt Injected Grade "E" Drums	Hard Asphalt Injected Grade "C" Drums	Total Asphalt Injected Drums	Maximum Pressure
1	60	47½	8		8	50
2	57	49	4		4	600
3	52	40½	10		10	700
4	53	41½	½		½	700
5	52	41	2½		2½	700
6	55	46	8½	3	11½	300
7	53	39½	½		½	700
8	54	37	5		5	700
9	58	41½	2		2	700
10	54	33	2		2	700
11	71	40	2		2	700
12	62½	34	1		1	300
13	54	20			13	700
14	54	23½	2½	6	8½	700
15	54	30½	7	6½	13½	275
16	31	9½	6½	2½	9	700
17	38	26½	2		2	700
18	36	20	2		2	700
19	39	13½	4	7	11	150
20	34½	13½	2	3	5	350
21		No Attempt.				
			73	[illegible]	113	

Remarks:

Hole No.1 Pressure limited on account of proximity to edge of spillway.

Hole No.6 Pressure limited by easy opening to overburden.

Hole No.15,19,20 Pressure limited by easy opening to overburden.

One drum contains approximately 7 cu.ft.

Hole No. 13 There was no record of the kind of asphalt used on the amount used there only in the Total column which explains the discrepancy in totaling the hard and soft asphalt columns.

Cont'd on

STATE OF NEW YORK—HUDSON RIVER REGULATING DISTRICT

SUBJECT: Log of Deep Well Holes for Asphalt Grouting
Conklingville Dam

FILE:
ACC. NO.:
SHEET 1

COMPUTER: 19__ CHECKED BY: 19__

MADE IN CONNECTION WITH:

REFERENCE: Bk.89 Pg.25 & Well Hole Log

CONT'D FROM ACC.

Well Hole No.	Elev. of Ground at top of hole.	Total Depth	Depths to seams.
1	758.5	59	7-11-21
2	756.0	58	7 broken to 9-12-22
3	751.1	56	4-11-13 broken to 17-26-30-47
4	749.2	53½	2 broken to 14-20-49
5	746.6	51	32-49
6	746.2	52	Earth & rock to 3-8-19-27-40-47-49
7	746.0	53	Earth & rock to 5½-7-19-29-38-51½
8	745.9	55	Earth & rock to 7-14-19-36-49½-53½ broken to 55
9	745.6	55	Earth & rock to 8-22½-39-47 broken to 49-51
10	745.7	52½	Earth & rock to13-20-45-50
11	745.3	61	Earth & rock to 13-14½ broken to 17½-21-30 broken to 38-50-53-54-57 broken to 59
12	745.3	60	Earth & rock to 19-30-43-50 broken to 58
13	745.1	60	Earth & rock to25-45
14	741.0	54	Earth & rock to 18-45 broken to 47
15	736.0	54	Earth & rock to 15-17 broken to 19-25 broken to 29-37
16	731.8	35	Earth & rock to 12½-25 broken to 29
17	717.2	47	Earth & rock to 6-19-21
18	714.0	16	Earth & rock to 8
19	710.6	39	Earth & rock to 10-14-18-24
20	705.9	34	Earth & rock to 17
21	704.2	33	Earth & rock to 20-26

STATE OF NEW YORK—HUDSON RIVER REGULATING DISTRICT

SUBJECT: Location of Jackhammer Holes for Asphalt Grouting at Conklingville Dam.

FILE

ACC. NO.

SHEET 4

COMPUTER ______ 19__ CHECKED BY ______ 19__

MADE IN CONNECTION WITH

REFERENCE Bk.111 Pg.25-26

CONT'D FROM ACC.

COMPLETE FILING SYMBOL

Instrument at 7+00 at 74.65' Right 0° 00' south on Center line of Dam

Hor.Angle	Hor.Dist.	Elev.	
240-20	11.7	729.8	
168-06	7.7	727.8	
122-30	10.8	727.3	
141-59	13.8	729.2	
169-50	10.0	731.9	Well Hole
165-55	12.6	733.4	
233-14	15.2	736.4	
211-49	16.9	738.3	
165-24	15.0	734.2	Well Hole
162-33	17.1	734.4	
152-13	17.8	732.2	
162-02	22.0	732.8	
182-24	22.2	736.4	
168-44	20.0	735.2	Well Hole
203-34	23.0	738.7	
190-38	27.3	[illegible]	
181-00	25.0	739.1	Well hole
181-00	25.6	739.7	
161-02	26.4	737.1	
348-37	10.1	717.2	Well hole
361-05	1.6	726.2	Well Hole
353-40	10.8	709.7	Well Hole
32-15	18.6	709.3	
355-19	16.9	707.8	
329-23	23.1	707.1	
322-46	19.1	710.1	
351-45	19.0	712.6	
41-00	14.1	715.6	
64-21	10.2	721.0	
350-28	7.7	719.3	
311-41	14.8	715.7	
293-45	11.8	722.9	
342-48	5.7	721.8	Well Hole
344-47	3.0	724.1	
94-11	9.3	72[illegible].3	
190-17	4.7	727.2	Well Hole
210-13	[illegible].1	727.0	
259-15	10.8	735.0	

CONT'D ON ACC.

STATE OF NEW YORK—HUDSON RIVER REGULATING DISTRICT

SUBJECT: Copy of Field Reports Submitted by American Asphalt Grouting Co. Operator.

FILE:

ACC. NO.

SHEET 7

COMPUTER ______ 19__ CHECKED BY ______ 19__

MADE IN CONNECTION WITH Surface Grouting at Conklingville Dam

CONT'D FROM ACC.

REFERENCE

May 25 1929

Kettle placed - 12 holes drilled - 6 pipe installed as per sketch

Upstream No.4

Center line No.4 & 5

Downstream No. 3,4,5

All holes 10 feet in rock except Upstream No.4 which had broken drill steel in it.

All pipe perforated 4 feet at bottom.

June 2 1929

All holes in each line from No. 1 to 5 inclusive grouted.

Used 9 drums of asphalt filling practically all cracks.

Used 600 lbs. pressure.

Hole No. 2 in downstream line took 3 drums of asphalt. Asphalt came out about 15 feet away from hole also filled big crack back by other holes.

Some of the holes took hardly any asphalt except enough to fill the pipe.

June 6 1929

All holes from No. 6 to 13 inclusive in each line were grouted.

Due to water and dirt being in the way and rock being more solid, grouting was stopped here.

Used 3 drums of asphalt from concrete form as far as grouted that is in Holes 6 to 13 inclusive.

None of the holes took very much of the asphalt.

Holes are numbered with the well holes that had been previously grouted beginning with No. 1 between No. 1 and [illegible] in the old well hole line.

ELEVATION OF SETTLEMENT PIPES AT CONKLINGVILLE DAM.

Date	105+00 Left	105+00 Right	109+00 Left	109+00 Right		Reference Book	Reference Page	
5/21/30	794.91	794.83	794.77	794.90	.85	111	62	
6/12/30	794.71	794.60	794.62	794.62	64	111	68	
7/16/30	794.66	794.54	794.58	794.57		111	71	
12/ 2/30	794.56	794.46	794.49	794.48		111	74	
6/ 4/31	794.49	794.33	794.35	794.33		107	32	✓
10/21/31	794.48	794.33	794.35	794.33		113	7	✓
4/ 9/32	794.44	794.31	794.31	794.28		113	8	✓
8/10/32	794.44	794.30	794.30	794.28		113	17	✓

Days Diff.	Difference of elevation between tests				Av.	Rate
22	0.20	0.23	0.15	0.29	0.22	0.01000
34	0.05	0.06	0.04	0.05	0.05	0.00147
139	0.10	0.08	0.09	0.09	0.09	0.00065
184	0.07	0.13	0.14	0.15	0.12	0.00065
139	0.01	0.00	0.00	0.00	0.0025	0.00002
171	0.04	0.02	0.04	0.05	0.04	0.00023
123	0.00	0.01	0.01	0.00	0.005	0.00004
Total Diff.	0.47	0.53	0.47	0.62	0.52	

BOARD OF HUDSON RIVER REGULATING DISTRICT
11 NORTH PEARL STREET
ALBANY, N. Y.
TELEPHONES 4-2825, 3-4823

(5/2)

Conklingville, N.Y.
May 1, 1933.

Mr. E. H. Sargent Chief Engineer
Hudson River Regulating District
11 North Pearl St.
Albany, N.Y.

Dear Mr. Sargent:

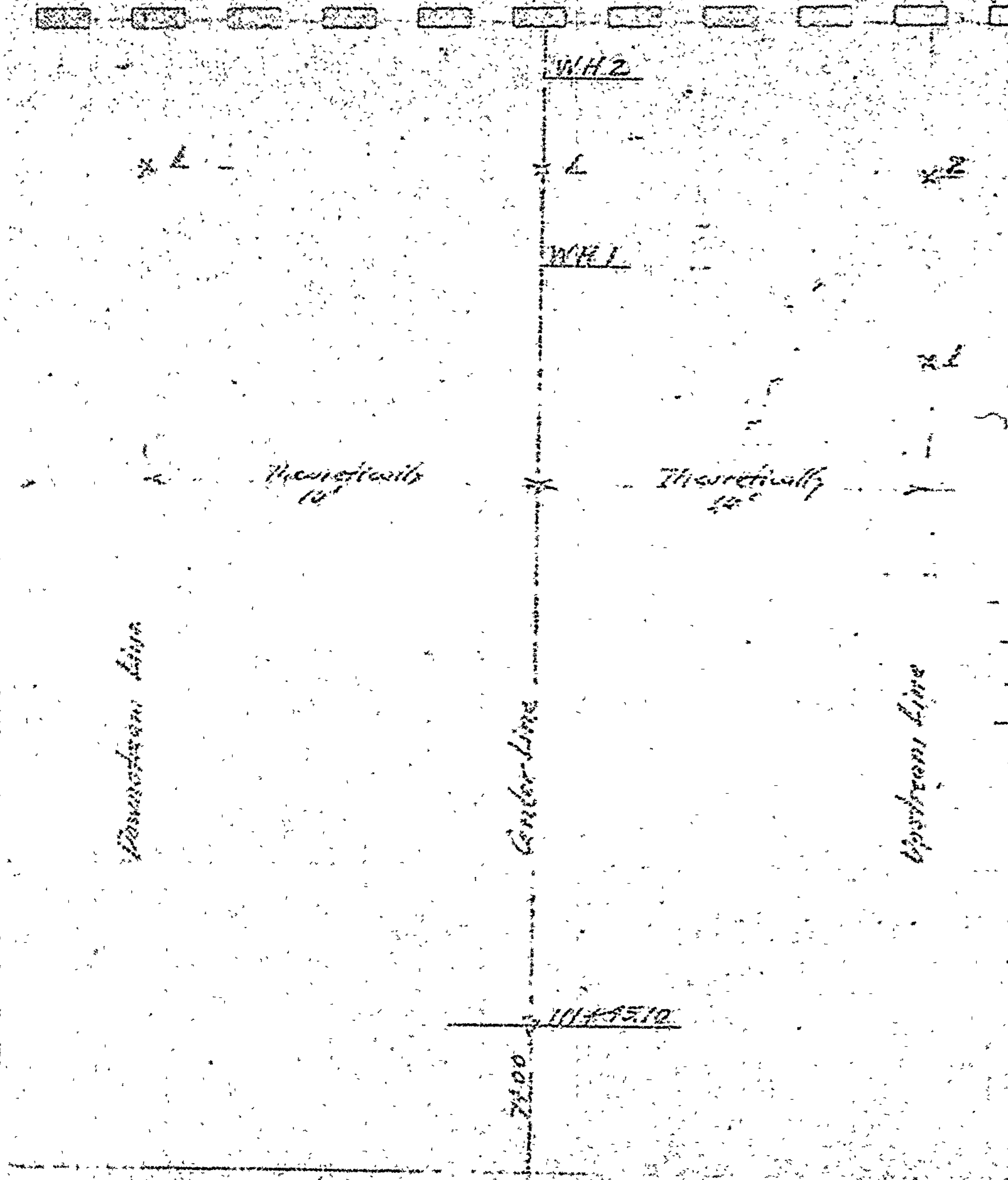
Below are the results of the elevations taken on the settlement pipes at the Conklingville Dam on May 1, 1933.

Date	103+00 Left	103+00 Right	109+00 Left	109+00 Right	Reference Book	Page
5/1/33	794.31	794.27	794.25	794.23	115	51
Days Diff.	Diff. of Elev.		Diff. of Elev.		AV.	Rate
263	0.03	0.03	0.05	0.05	0.04	0.00015
Total days Diff. since first meas.	Total Diff. of Elev. since first meas.				AV.	
1075	0.50	0.53	0.52	0.67	0.56	

Very truly yours,

H. B. Davidson

Assistant Engineer



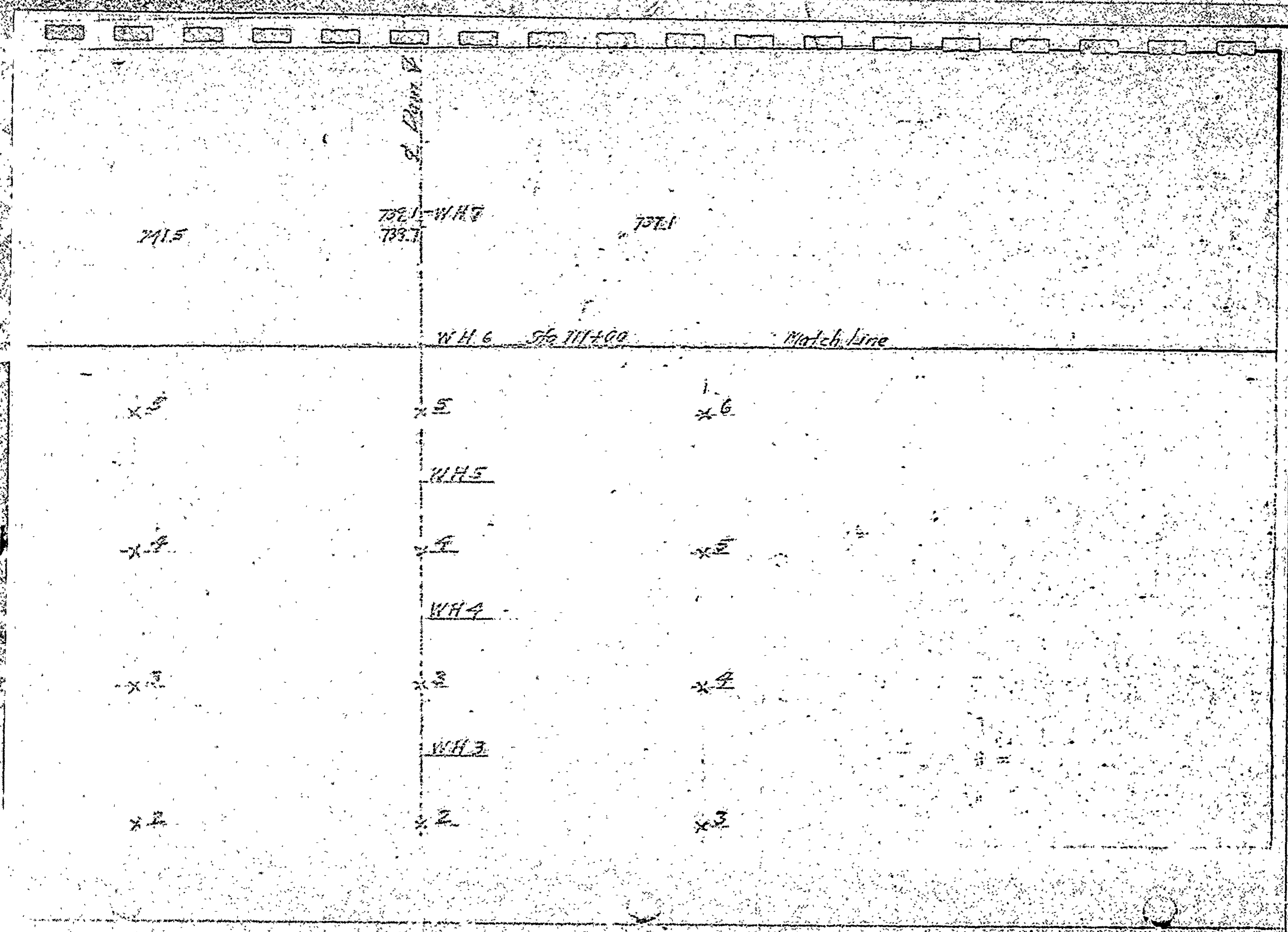
LOCATION OF

ASPHALT GROUT HOLES

CONKLINGVILLE DAM

SCALE 1" = 4'-0" APRIL 1933 RBD

SHEET 6



℄ Dam
741.5
733.7
W.H. 6
Sta 111+00
Match Line
WH 5
WH 4
WH 3

E.R. Hayek

REPORT ON THE NORTH ABUTMENT OF THE CONKLINGVILLE DAM

OF

THE SACANDAGA DEVELOPMENT OF

THE HUDSON RIVER REGULATING DISTRICT.

BY

IRVING B. CROSBY, GEOLOGIST.

APRIL, 1928.

REPORT ON THE NORTH ABUTMENT OF THE CONKLINGVILLE DAM
OF THE SACANDAGA DEVELOPMENT OF THE
HUDSON RIVER REGULATING DISTRICT.

By Irving B. Crosby, Geologist.

INTRODUCTION.

Previous geological and engineering reports and studies of this dam site have taken up the question of the origin and characteristics of the unconsolidated deposits along the banks and in the river bed, but have paid little attention to the bed rock in the north abutment, the only part of the dam where rock is at the surface.

This rock is a granite gneiss and although cracks could be seen in the natural ledges it had been supposed that the rock would be more solid below the surface. However, excavation for the spillway channel has disclosed the disturbing fact that the shattered condition of the rock continues to some depth and therefore it was decided to have a geological investigation made of this condition.

On account of the above mentioned reasons this report is almost entirely confined to the bed rock of the north abutment.

SUMMARY.

The bluff which will form the north abutment of the Conklingville Dam on the Sacandaga River is composed of gneissic granite with a fairly well developed foliation which dips into the bluff. The continuity of the rock is broken by numerous joint cracks most of which can be referred to one of three systems. The joints of one of these systems dip towards the river at an angle of approximately 50° to 55°. These joints form sliding planes along which slides may occur if the rock is undermined.

The joint cracks extend downward indefinitely and although the crack may be less open at considerable depths the continuity of the rock is broken and planes of weakness exist.

At the depth to which it is proposed to carry the excavation for the spillway channel it is probable that the rock will still be much broken although it is possible that the sliding planes will be farther apart and the masses will be larger.

The excavation of the spillway channel, with the north wall much steeper than the dip of the sliding planes the strike of which is nearly parallel to it, will leave a large triangular shaped mass of rock without any support except the friction on the sliding planes. If this condition is brought about slides may be expected in the near future.

It is recommended that the north wall of the channel should not be steeper than the slope of the sliding planes which for the purposes of estimates may be considered as 55°.

Well developed joint planes at the right position should be chosen to form the wall of the channel and all rock above these should be removed.

It will be necessary to carry the foundations for the retaining wall down to a depth where the rock appears fairly solid and if this is done the sliding planes will probably cause no trouble as there will be no danger of the rock being undermined. As the sliding planes under the retaining wall will dip away from the spillway channel the presence of the latter will not render the rock under the retaining wall unstable.

GENERAL GEOLOGY OF THE DAM SITE.

The bed rock of the dam site is a granite in which a foliation or gneissic structure has been produced to a varying degree. This granite was intruded into limestone which accounts for the fact that there are occasional inclusions of limestone in the granite. These conditions are much more pronounced to the west and northwest of Conklingville. The rock at the dam site has the composition of granite and has a gneissic structure-- therefore it is properly designated as a gneissic granite. It is composed of feldspar, quartz, biotite or black mica and hornblende. From an engineering point of view this rock is not as desirable as a granite without the gneissic structure because it is somewhat liable to break into placy pieces but this tendency is not marked and will probably not interfere with its use as concrete aggregate.

The structure of the granite is variable but at the dam site the dip of the foliation averages 45° to the N. E. More important in relation to the stability of the dam is the jointing which divides the rock into blocks of varying size. These joint cracks may be referred to three systems of fairly uniform dip and strike and there are other joints which do not belong to any of these systems. In fact it is the jointing which has made this investigation necessary. These joint systems will be described more fully in the

next section.

Most of the surface rocks of the earth are broken up by joint cracks but here, at the north abutment of the dam, the rocks as exposed by excavations, present an unusually shattered appearance and this condition requires an explanation.

The profile of the mountain above the dam shows that there is a nearly flat bench at an elevation of about 1000'. One set of joint cracks is parallel with the surface of the bluff above the river and also with the face of the bluff between the above mentioned bench and the top of the mountain. These joints act as sliding planes and if the bluff is undermined great rock slides will occur. During the glacial period the ice removed a great amount of rock from the base of the mountain slope, forming steep cliffs and leaving a large mass of rock unsupported except for friction along the joint planes. It appears probable that when the ice melted away a section of the mountain slid down into the valley. The mass which slid was so large that it was not broken into separate blocks although it was much cracked. This explanation of the shattered condition of the bluff at the dam site cannot be absolutely proved but the known facts strongly suggest that the spur of the mountain against which the dam will abut has been much disturbed and shattered, and in any case the observable facts show that the rock at the north abutment of the dam is not sound but is much more cracked and broken than would normally be expected in a

rock of this character.

The valley bottom and much of the hillsides are covered with various types of glacial drift which were deposited at the end of the ice age; but the investigation and description of these deposits is outside the scope of this report.

GEOLOGY OF THE NORTH ABUTMENT.

The gneissic granite bed rock of the north abutment is cut and divided into blocks of varying sizes by joint cracks which run in several directions. The direction or strike, and inclination to the horizontal or dip of these joint cracks are very important factors which directly control the stability of the abutment. If the joint cracks were all horizontal or vertical with none inclined then the hillside would be comparable with a wall of masonry laid up dry and would be stable except in the case of severe earth movements but such is not the case here as the cracks are not horizontal but are inclined towards the river.

Numerous observations were made on the strike and dip of these joints and on the foliation, using a Brunton Compass, and the directions as given are all referred to the Magnetic North. For convenience in comparing these directions with the course of the spillway channel and the center line of the dam it was determined that the direction of the center line of the spillway channel between stations 9 and 10 is N 57° W.

The foliation of the granite is not perfect enough to greatly weaken the rock and it dips back into the bluff away from the river and is not a source of weakness in the abutment. The strike of the foliation is N 60° W and the dip 45° N. E. Further consideration of it is not necessary in this problem except as it effects the use of the rock as concrete aggregate.

The joints fall into five groups three of which appear to be fairly well developed systems. For convenience these

will be numbered. System 1 has an average strike of N 65° W and an average dip of 50° to 55° to the S. W. The strike varies from 60° to 70° north of west and the dip from 42° to 68° to the southwest. This is the most important of the three joint systems in its relation to the dam and to the spillway channel because the joint planes are practically parallel to the surface of the bluff in the north abutment and they thus form sliding planes down which masses of rock will probably slide if they are undermined by the removal of the supporting rock.

The second system has a strike of 60° to 65° west of north and a dip of from 45° to 80° to the northeast. The average dip for this system is about 65° N. E. The strike is practically the same as for the first system but the dip is in the opposite direction. The effect of this system of joint planes is to break the continuity of the rock at right angles to the dip of the sliding planes and thus make it easier for separate blocks to slide out of place. The joints of this system seem to be the most regularly developed of any of the systems.

The third system is nearly at right angles with the first system having an average strike of N 20° E and a dip of 80° W to vertical. This is the least well developed of the three systems but it is effective in further dividing up the rock into blocks which will slide easily when their support is removed.

Other joints were found with strikes of N 20° W and dips of 80° W and also with strikes of N 60° E and dips of 80° N. W. These stray joint cracks increase the lack of continuity in the rock and reduce its strength.

To add to the shattered and unstable condition many of these cracks are open thus permitting water to enter. When this water freezes it exerts a tremendous force on the blocks prying the cracks open wider and rendering the mass less stable.

The cores from ten drill holes, numbers 117, 118, 201, 203, 204, 205, 206, 207, 208 and 210 were examined and it was found that there were few long pieces of core, none over a foot long, and that most of it was in very short pieces. Despite this the core recovery was fairly high for most of the holes which indicates that the rock where unbroken is sound but that there are many cracks which cause the cores to break into small pieces.

The north abutment of the dam is on the convex side of a sharp curve in the river and the water has been actively cutting into the bluff and undermining the layers of rock thus allowing blocks to slide down from time to time. When the dam is built this undercutting by the river will cease and the bluff would be more stable than it has been in the past but the proposed spillway channel will undermine the bluff more than the river would in hun-

dreds of years and will thus bring about a very unstable and dangerous condition.

The spillway channel as first planned would have a north wall about a hundred feet high with a slope of approximately 80°, while the sliding planes dip in the same direction on an average of 50° to 55°. This would leave a triangular shaped mass of rock unsupported except for friction along the sliding planes and water seeping through these joint cracks would act as a lubricant to reduce the friction. In addition every time water froze in the cracks there would be a strong force pushing the blocks down hill. Under these conditions it is certain that large blocks would repeatedly break away and plunge into the spillway channel if, indeed, the entire undermined mass did not slide down in one grand and disastrous rush.

Earthquake shocks of moderate intensity are known to occur occasionally in this region and even a mild shock might act as the trigger to let loose the unstable mass perched on its sliding planes.

It may be argued that these joint cracks will die out at a moderate depth and that the rock will be more solid but such a view is supported neither by accepted geologic theory nor by observation in mines and quarries. The joints of the second and third systems undoubtedly extend downwards to the region where the rocks are plastic and

cracks can not exist. It is believed to be many miles down before such a condition is reached, which means that as far as this problem is concerned the depth of these joint cracks is indefinite. The joints of the first system are practically parallel to the surface of the bluff and these may become more widely spaced and die out with depth but observations in deep quarries prove that at depths of one to two hundred feet and more these joints are well developed but not so closely spaced as at the surface. These facts prove that the most that can be hoped for is that the layers of rock between the sliding planes will be somewhat thicker at the depth of the bottom of the spillway channel.

If the layers of rock in the north abutment are undermined, as will be the case if the spillway channel is excavated as originally planned, slides of a greater or less extent are almost a certainty and probably trouble will begin in a short time, that is, in a few years.

Slides along joint planes or bedding planes where the rocks have been undermined are not rare occurrences. A recent and somewhat similar case occurred during the collapse of the St. Francis Dam in California.* There the planes of schistosity or foliation in the schist were parallel with the slope of the eastern wall of the canyon and furnished sliding planes upon which a great slide occurred when the

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* "Geological Formations at the St. Francis Dam Site" by Hyde Forbes, Engineering News-Record, Vol. 100, No. 15, pp [illegible]

dam broke and the saturated mass of the east bank was undermined by the rushing waters from the break in the west end of the dam. Of course there is little similarity between the weak schist at the St. Francis Dam with the very pronounced foliation and the strong granite at the Conklingville Dam but there is apparently great similarity between the structures of the two rocks. In one case the sliding planes were formed by the foliation of the schist and in the other case by the joints of the granite.

To sum up the situation in the north abutment: The rock is much divided by joints some of which are practically parallel with the bluff and form sliding planes dipping towards the river. This situation is not dangerous if the base of the bluff is not undermined but the river has been slowly cutting into the base of the bluff and from time to time small slides have undoubtedly occurred. This condition will be stopped by the building of the dam but a much more dangerous condition will be produced by the excavation of the deep spillway channel which will undermine a large mass of rock and leave it without support except friction along the sliding planes.

The measures which are desirable to avoid the dangerous condition above described will be taken up in the next section of this report.

CONCLUSIONS AND RECOMMENDATIONS.

To avoid trouble from the unstable conditions in the north abutment certain precautionary measures and changes of plan are desirable. The most complete remedy for the situation would be to leave the bluff undisturbed and not excavate the spillway channel but there are good engineering reasons why this cannot be done.

When the spillway channel is excavated it will be necessary, in order to avoid the danger of slides, to reduce the slope of the north wall of the channel to that of the sliding planes, that is approximately 50° to 55°. For the purpose of estimating the amount of excavation necessary it is probably safe to call the slope 55°. These joint planes are not true planes but are somewhat wavy and are not exactly parallel to the spillway channel; therefore instead of excavating to a certain angle it will be better to choose a prominent joint plane and remove the rock above that, changing to other planes as the difference in strike between the planes and the spillway channel makes it necessary.

Care should be taken not to shatter the bed rock when excavating and it is recommended that when stripping off the rock above the sliding planes heavy charges of dynamite should be avoided. The joint cracks will facilitate the removal of the rock with less blasting than would otherwise be necessary.

There is a possibility that the joints will be sufficiently far apart at the bottom of the spillway channel so that it will not be necessary to choose a plane which leads to that depth. This should be decided when excavation has disclosed the conditions of the rock.

It is possible to move the spillway channel towards the river and by so doing to decrease the amount of rock to be excavated. Of course such a change in the position of the channel will move the retaining wall nearer the river and will make it more difficult to obtain satisfactory foundations for that wall and will also necessitate more excavation for the foundations. The rock under the retaining wall will of course be broken by joint planes but it will be beyond danger of undermining in the future and if the foundations are carried down to a point where the rock is reasonably solid and has not been disturbed by the undermining action of the river satisfactory foundation conditions should be found.

The natural rock wall on the river side of the channel will not be endangered by the sliding planes as they dip away from it, but the steep joints of the second system nearly coincide with this wall and may well determine its slope.

The north wall of the spillway channel will be unstable and dangerous unless the following conditions are met: This

wall of the channel should not be steeper than the joint planes and all rock which does not have a solid support should be removed.

The changes of plan necessary to meet these conditions are engineering matters but it is urged that if the slope is anywhere made steeper than the sliding planes it should be done only after a very careful examination has been made of the rock at that point.

If the above conditions are provided for it is believed that the abutment will then be in a fairly stable condition and that there will probably be little danger from slides.

All of which is respectfully submitted.

Irving B. Crosby

Consulting Geologist.

Boston, Massachusetts,

April 23, 1928.

37-15-4
(Rev. 3/77)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DAM INSPECTION REPORT
(By Visual Inspection)

Dam Number	River Basin	Town	County	Hazard Class	Date & Inspector
415	Upper Hudson	Hadley	Saratoga	C+	[illegible] G. Koch, W. [illegible], W. Glenn

Stream = Sacandaga Reservoir   Owner = Hudson-Black River Regulating District

Type of Construction

- [X] Earth w/Concrete Spillway
- [ ] Earth w/Drop Inlet Pipe
- [ ] Earth w/Stone or Riprap Spillway
- [ ] Concrete
- [ ] Stone
- [ ] Timber
- [ ] Other ______

Use

- [ ] Water Supply
- [X] Power
- [X] Recreation - [X] High Density
- [ ] Fish and Wildlife
- [ ] Farm Pond
- [ ] No Apparent Use-Abandoned
- [X] Flood Control
- [ ] Other ______

Estimated Impoundment Size 27,000 Acres   Estimated Height of Dam above Streambed 95 Ft.

Condition of Spillway

- [ ] Service satisfactory
- [X] In need of repair or maintenance
- [X] Auxiliary satisfactory
- [ ] In need of repair or maintenance

Explain: See attached memo

Condition of Non-Overflow Section

- [X] Satisfactory
- [ ] In need of repair or maintenance

Explain: In good condition

Condition of Mechanical Equipment

- [X] Satisfactory
- [ ] In need of repair or maintenance

Explain: ______

Siltation [ ] High [ ] Low

Explain: ______

Remarks: ______

Evaluation (From Visual Inspection)

- [ ] Repairs req'd. beyond normal maint.
- [X] No defects observed beyond normal maint.

15 (12/75)

New York State Department of Environmental Conservation

MEMORANDUM

TO: The Files
FROM: G. Koch G.K.
SUBJECT: Conklingville Dam #415 Upper Hudson Basin

DATE: September 26, 1977

On September 22, 1977 I inspected the Conklingville Dam on the Sacandaga Reservoir with Wm. Coleman and Ken Harmer. We met with John Anderson the engineer with the Hudson-Black River Regulating District. Mr. Anderson described the operating procedure at the dam.

Operation

This dam provides flood protection and low flow augmentation to the downstream residents on the Hudson River. The average daily flow through the Niagara Mohawk power development at the dam (E. J. West) is 2000 cfs. From about the middle of March to the middle of April the outlet gates at the Conklingville dam are closed. Water is stored in the reservoir. During this period of high spring runoff virtually no flow enters the Hudson from the Sacandaga River. This reduces the flood threat to the downstream residents by storing water from a 1044 square mile drainage basin. During the summer when flows are low in the Hudson River, water is released at the dam in order to provide a minimum flow of 3000 cfs at the confluence of the Hudson and Sacandaga Rivers at Hadley, NY.

Inspection

The inspection indicated that the dam ~~was~~ is in good condition.

The concrete on the downstream face of the ogee weir spillway has spalled. The concrete on the upstream face and crest of the spillway is in good condition. The regulating district feels that concrete repairs are not necessary unless the deterioration increases to a depth of around six inches. Since this is a massive concrete structure and appears structurally sound, we agree with that conclusion.

12-21-76

Saxa

DER DAM INSPECTION REPORT

Sediment Res.

RB	CTY	YR. AP.	DAM NO.	INS. DATE	USE	TYPE
01	46	24	000415	110876	001	2

AS BUILT INFORMATION

[1] Location of Sp'way and outlet

[1] Elevations

[1] Size of Sp'way and Outlet

[1] Geometry of Non-overflow section

[1] GENERAL CONDITION OF NON-OVERFLOW SECTION

[1] Settlement

[1] Cracks

[1] Deflections

[1] Joints

[2] Surface of Concrete

[1] Leakage

[1] Undermining

[1] Settlement of Embankment

[1] Crest of Dam

[1] Downstream Slope

[1] Upstream Slope

[1] Toe of Slope

[1] GENERAL COND. OF SP'WAY AND OUTLET WORKS

[1] Auxiliary Spillway

[2] Service or Concrete Sp'way

[1] Stilling Basin

[2] Joints

[2] Surface of Concrete

[1] Spillway Toe

[2] Mechanical Equipment

[1] Plunge Pool

[1] Drain

[1] Maintenance

[C] Hazard Class

[3] Evaluation

[37] Inspector

COMMENTS:

Good Condition

3-29-24-1000 (6-1925)

STATE OF NEW YORK
DEPARTMENT OF
State Engineer and Surveyor
ALBANY

Received [illegible] 1926 Dam No. 315 Hudson Watershed
Disposition Approved [illegible] 1926 Serial No. 721
Foundation inspected
Structure inspected

Application for the Construction or Reconstruction of a Dam

Application is hereby made to the State Engineer, Albany, N. Y., in compliance with the provisions of Chapter LXV of the Consolidated Laws and Chapter 647, Laws of 1911, Section 22 as amended, for the approval of specifications and detailed drawings, marked Conklingville Dam, Sacandaga Reservoir - Accessions 2614, 2615, 2616 and 2617. herewith submitted for the {construction / ~~reconstruction~~} of a dam located as stated below. All provisions of law will be complied with in the erection of the proposed dam. It is intended to complete the work covered by the application about November 1, 1929. (Date)

1. The dam will be on Sacandaga River flowing into Hudson River in the town of Hadley County of Saratoga and at the Hamlet of Conklingville.
(Give exact distance and direction from a well-known bridge, dam, village, main crossroads or mouth of a stream)

2. The name and address of the owner is State of New York, Hudson River Regulating Dist., Albany, N. Y.

3. The dam will be used for Storage Reservoir.

4. Will any part of the dam be built upon or its pond flood any State lands No

5. The watershed at the proposed dam draining into the pond to be formed thereby is 1,044 square miles.

6. The proposed dam will have a pond area at the spillcrest elevation of 26,400 acres and will impound 37,800,000,000 cubic feet of water.

7. The lowest part of the natural shore of the pond is 30 feet vertically above the spillcrest, and everywhere else the shore will be at least 30 feet above the spillcrest.

8. The maximum known flow of the stream at the dam site was 35,500 cubic feet per second on Mar. 28, 1913. (Date)

9. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the proposed dam Yes.

10. The natural material of the bed on which the proposed dam will rest is (e.g., sand, gravel, boulders granite, shale, slate, limestone, etc.) Main earth dam will rest on glacial deposits. Spillway will rest on rock. (Granite gneiss)

NOTE: For data required by 11 and 12, see accompanying maps.

11. The material of the right bank, in the direction with the current, is ....; at the spillcrest elevation this material has a top slope of ....inches vertical to a foot horizontal on the center line of the dam, a vertical thickness at this elevation of....................feet, and the top surface extends for a vertical height of ....feet above the spillcrest.

12. The material of the left bank is..........................; has a top slope of..............inches to a foot horizontal, a thickness of..................feet, and a height of..................feet.

13. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc......See log of test pits and borings...............................

....

For answers to 14, 15 and 16, see geological section.

14. If the bed is in layers, are the layers horizontal or inclined?.................................. If inclined what is the direction of the horizontal outcropping relative to the axis of the main dam and the inclination and direction of the layers in a plane perpendicular to the horizontal outcropping...

....

15. What is the thickness of the layers?....................................

16. Are there any porous seams or fissures?...

....

17. WASTES. The spillway of the above proposed dam will be......400.........feet long in the clear, the waters will be held at the right end by an earth dam........................the top of which will be ......24.......feet above the spillcrest, and have a top width of ......40.......feet; and at the left end by a spillway and hillside, the top of which will be over 50....feet above the spillcrest, ~~and have a top width of..........feet~~.

18. There will be available for flood discharge 3 pipes ....96...... inches inside diameter and the bottom will be ..72.. feet below the spillcrest [illegible] ~~and the bottom will be .... feet below the spillcrest~~.

19. APRON. Below the proposed dam there will be an apron built of...feet long across the stream, ...feet wide and ....feet thick. The downstream side of the apron will have a thickness of..................feet for a width of..................feet.

20. PLANS. Each application for a permit of a dam over 12 feet in height must be accompanied by a location map and complete working drawings in triplicate of the proposed structure, one set of which will be returned if they are approved. Each drawing should have a title giving the parts shown, the name of the town and county in which the dam site is located, and the name of the owner and of the engineer.

The location map (U. S. Geological Quadrangle or other map) should show the exact location of the proposed dam; of buildings below the dam which might be damaged by any failure of the dam, of roads adjacent to or crossing the stream below the dam, giving the lowest elevation of the roadway above the stream bed and giving the shape

the height and the width of stream openings; and of any embankments or steep slopes that any flood could pass over. Also indicate the character and use made of the ground below the dam.

The complete working drawings should give all the dimensions necessary for the calculations of the stability of the structure, and all the information asked for below under "Sketches." There may be attached to the application any written reports, calculations, investigations or opinions that may aid in showing the data and method used by the designer. State the assumed ice and uplift pressures and the conditions on which based.

21. SKETCHES. For small and unimportant structures, if plans have not been made, on the back of this application make a sketch to scale for each different cross-section at the highest point; giving the height and the depth from the surface of the foundation, the bottom width, the top width (for a concrete or masonry spill at 18 inches below the crest), the elevation of the top in reference to the spillcrest, the length of the section, and the material of which the section is to be constructed, on the spillway section show a cross section of the apron, giving its width, thickness and material, and show the abutment or wash wall at the end of the spillway, giving its heights and thickness. Mark each section with a capital letter. Also sketch a plan; show the above sections by their top lines, giving the mark and the length of each; the openings by their horizontal dimensions; the abutments by their top width and top lengths from the upstream face of the spillcrest; and outline the apron. Also sketch an elevation of each end of the dam with a cross section of the banks, giving the depth and width excavated into the banks.

22. ELEVATIONS. Also give the elevations, if possible from the Mean Sea Level, of at least two permanent Bench Marks; of the spillcrest for any existing dam on the proposed dam site, at the middle and at the ends of the spill; of the spillcrest for the above proposed dam; and of the spillcrest of any adjacent dams.

23. SAMPLES. When so instructed, send samples of the materials to be used in the construction of the proposed dam, using shipping tags which will be furnished. For sand, one-half a cubic foot is desired (exclusive of any stone over ½ inch in size mixed therewith); for cement, three pints; and for the natural bed, twenty cubic inches if of ledge and one-half a cubic foot if of soil.

24. INSPECTION. State how inspection is to be provided for during construction. Construction to be carried out under general inspection of Resident Engineer, Chief Engineer and Consulting Engineer.

25. WATER SUPPLY. Are the waters impounded by the above dam to be used for a public water supply? No.
Has an application under the provisions of Article III of the Conservation Law for such use been made to the Water Control Commission, Albany, N. Y.?

17. In addition to the spillway there are incorporated in the plans, two 8 ft. by 18 ft. siphons priming at elevation 774.

18. The discharging capacity of the spillway and siphons under the assumed maximum flood condition is shown on Computation Accession W-344, submitted with application.

The above information is correct to the best of my knowledge and belief.

Albany, N. Y.
(Address of signer)

November 12, 1926.
(Date)

Chief Engineer, Hudson River Regulating Dist.
(A person acting for owner should indicate his title or authority)

2-1833-1000 (6-3740)

STATE OF NEW YORK
DEPARTMENT OF

State Engineer and Surveyor

ALBANY

Received Jan 28th 1924   Dam No. 415 Upper Hudson Watershed
Disposition [illegible]   Serial No. 549
Site inspected
Foundation inspected
Structure inspected

Application for the Construction or Reconstruction of a Dam

Application is hereby made to the State Engineer, Albany, N. Y., in compliance with the provisions of Chapter LXV of the Consolidated Laws and Chapter 647, Laws of 1911, Section 22 as amended, for the approval of specifications and detailed plans, marked Conklingville Dam, Sacandaga Reservoir

herewith submitted for the {construction / ~~reconstruction~~} of a dam located as stated below. All provisions of law will be complied with in the erection of the proposed dam.

1. The dam will be on Main branch of Sacandaga River in the town of Hadley County of Saratoga and at the hamlet of Conklingville
(Give exact distance and direction from a well-known bridge, dam, village, main cross-roads or mouth of a stream)

2. The name and address of the owner is State of New York, Hudson River Regulating District, Albany

3. The dam will be used for Storage Reservoir

4. Will any part of the dam be built upon or its pond flood any State lands? No

5. The watershed at the proposed dam draining into the pond to be formed thereby is 1,044 square miles.

6. The proposed dam will have a pond area at the spillcrest elevation of 26,600 acres and will impound 37,800,000,000 cubic feet of water.

7. The lowest part of the natural shore of the pond is 50 feet vertically above the spillcrest, and everywhere else the shore will be at least 50 feet above the spillcrest.

8. The maximum known flow of the stream at the dam site was 75,[illegible] cubic feet per second on March 28, 1913 (Date)

9. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the proposed dam Yes

10. The natural material of the bed on which the proposed dam will rest is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.) Main Earth Dam will rest on glacial deposit. Spillway will rest on hard pan or rock

The above information is correct to the best of my knowledge and belief.

Albany, New York
(Address of agent)

January 28th 192[illegible]
(Date)

HUDSON RIVER REGULATING DISTRICT

By [illegible signature]

Secretary

(In signing as agent for Applicant should indicate his office or authority.)

Note: For data required by 11 and 12 see accompanying maps.

11. The material of the right bank, in the direction with the current, is......................; at the spillcrest elevation this material has a top slope of..............inches vertical to a foot horizontal on the center line of the dam, a vertical thickness at this elevation of..............feet, and the top surface extends for a vertical height of..............feet above the spillcrest.

12. The material of the left bank is......................; has a top slope of..............inches to a foot horizontal, a thickness of..............feet, and a height of..............feet.

13. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc. See log of test pits and borings

For answers to 14, 15, 16 see geological section

14. If the bed is in layers, are the layers horizontal or inclined?.............................. If inclined what is the direction of the slope relative to the center line of the dam and the inches vertical to a foot horizontal?......................

15. What is the thickness of the layers?..............................

16. Are there any porous seams or fissures?..............................

17. Wastes. The spillway of the above proposed dam will be 800' feet long in the clear; the waters will be held at the right end by an earth dam the top of which will be 24 feet above the spillcrest, and have a top width of 40 feet; and at the left end by ~~a~~ hillside the top of which will be over 50 feet above the spillcrest, ~~and have a top width of ...... feet~~.

18. There will be also for flood discharge a pipe..............inches in diameter and the bottom will be..............feet below the spillcrest, a sluice or gate..............feet wide in the clear by..............feet high, and the bottom will be..............feet below the spillcrest.

19. Apron. Below the proposed dam there will be an apron built of..............................feet long..............feet wide and..............feet thick. The downstream side of the apron will have a thickness of..............feet for a width of..............feet.

20. Plans. Each application for a permit of a dam over 12 feet in height must be accompanied by a location map and complete working drawings of the proposed structure. Each drawing should have a title giving the parts shown, the name of the town and county in which the dam site is located, and the name of the owner and of the engineer.

The location map (U. S. Geological Quadrangle or other map) should show the exact location of the proposed dam; of buildings below the dam which might be damaged by any failure of the dam, of roads adjacent to or crossing the stream below the dam, giving the lowest elevation of the roadway above the stream bed and giving the shape, the height and the width of stream openings, and of any embankments or steep slopes that any flood could pass over. Also indicate the character and use made of the ground.

The complete working drawings should give all the dimensions necessary for the calculations of the stability of the structure, and all the information asked for below under "Sketches." There may be attached to the plans any written reports, calculations, investigations or opinions that may aid in showing the data and method used by the designer.

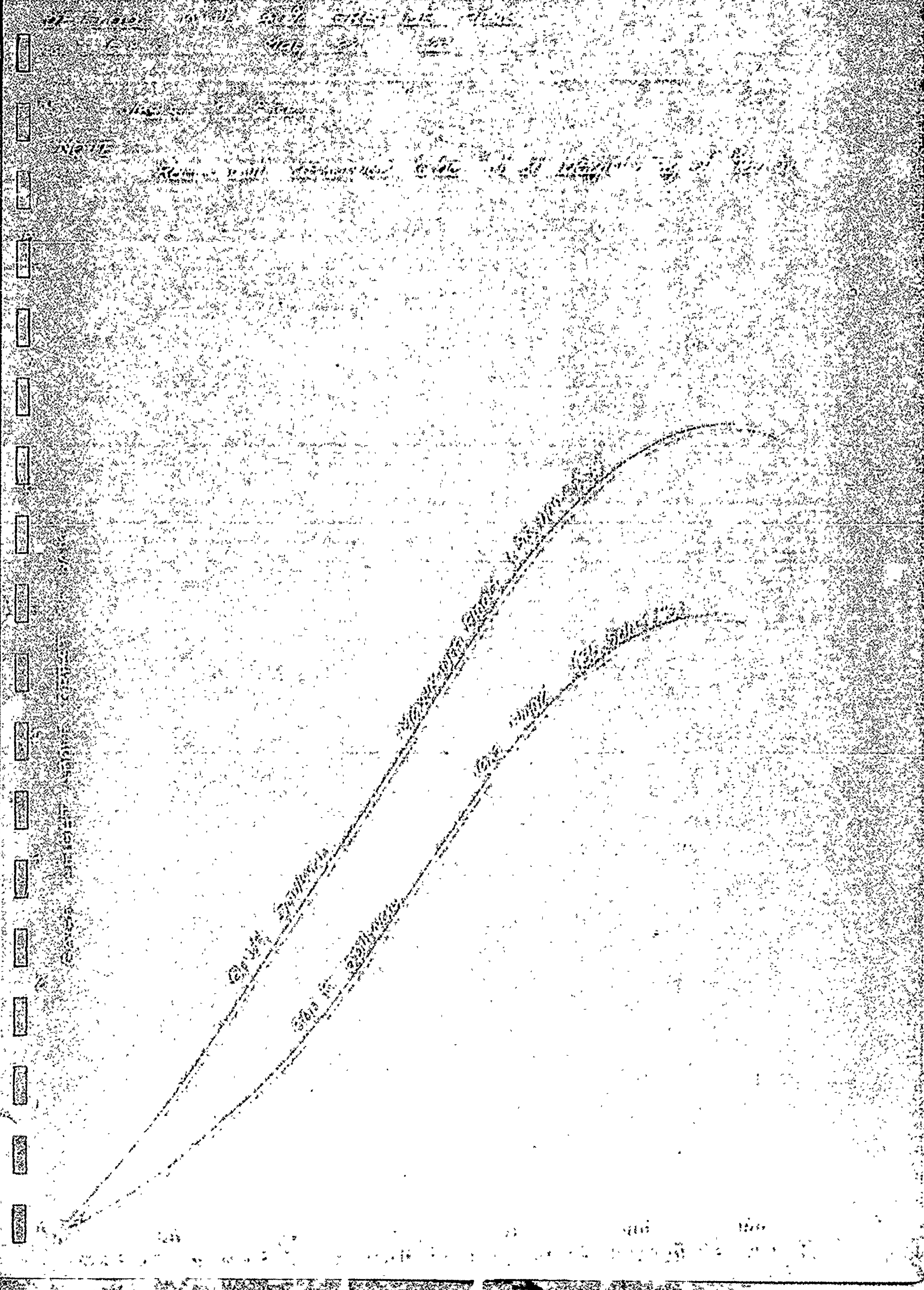
21. SKETCHES. For small and unimportant structures, if plans have not been made, on the back sheet of this application make a sketch to scale for each different cross-section at the highest point; showing the height and the depth from the surface of the foundation, the bottom width, the top width (for a concrete or masonry spill at 18 inches below the crest), the elevation of the top in reference to the spillcrest, the length of the section, and the material of which the section is to be constructed. Mark each section with a capital letter. Also sketch a plan; show the above sections by their top lines, giving the mark and the length of each; the openings by their horizontal dimensions; and the abutments by their top width and top lengths from the upstream face of the spillcrest and give the elevation of the top in reference to the spillcrest.

22. ELEVATIONS. Also give the elevations, if possible from the Mean Sea Level, of at least two permanent Bench Marks; of the spillcrest for any existing dam on the proposed dam site, at the middle and at both ends of the spill; and of the spillcrest for the above proposed dam.

23. SAMPLES. When so instructed, send samples of the materials to be used in the construction of the proposed dam, using shipping tags which will be furnished. For sand one-half a cubic foot is desired; for cement, three pints; and for the natural bed, twenty cubic inches.

24. INSPECTION. State how inspection is to be provided for during construction........................

Construction to be carried out under careful inspection of resident engineer, chief engineer and consulting engineer.



BOARD OF HUDSON RIVER REGULATING DISTRICT

23 SOUTH PEARL STREET

ALBANY, N.Y.

HENRY M. SAGE, PRESIDENT
EDGAR H. BETTS
ERSKINE C. ROGERS

TELEPHONE MAIN 4260

RANULF COMPTON, SECRETARY-TREASURER
EDWARD H. SARGENT, ENGINEER

Subject: Dam 415 Upper Hudson

February 14, 192[illegible].

Honorable Dwight B. LaDu, State Engineer,
Telephone Building,
Albany, New York.

Dear Sir: Attention: Hon. Arnold G. Chapman,
Deputy State Engineer.

In further reply to your letter of February 1st, requesting information in connection with the application of the Board for the approval of the plans of the Conklingville Dam, I beg to submit the following:

I believe that the specifications referred to as not having been received have since been received by you. Further, I have had delivered to Mr. McKim the additional prints desired by him.

Ice Pressure — The spillway dam is a part of the Conklingville dam which will create the Sacandaga Reservoir and varies in height from five feet at the westerly end to a maximum height of twenty-four feet at the easterly end. The maximum section is shown on the submitted plans and will be typical for the sections of lesser height. A careful study of the method of operating this reservoir shows that invariably the reservoir will be largely depleted during the winter and consequently no ice pressure will exist at the upper part of the spillway dam.

There has been provided at the spillway crest a bevel two feet vertically by 1.5 feet horizontally to cause the ice to slide up the dam in the remote cases where this ice condition might exist.

Further, an ice thrust of ten thousand pounds per lineal foot exerted at a point two feet below the crest of the dam has been assumed.

BOARD OF HUDSON RIVER REGULATING DISTRICT
23 SOUTH PEARL STREET
ALBANY, N. Y.
HENRY M. SAGE, PRESIDENT
EDGAR H. BETTS
ERSKINE C. ROGERS
TELEPHONE MAIN 4260
RANULF COMPTON
SECRETARY-TREASURER
EDWARD H. SARGENT
ENGINEER

Subject: Dam 415 Upper Hudson

State Engineer-Att: A.G.C. #2 February 14, 1924.

Uplift Uplift pressure has been assumed varying from two thirds that of the maximum head at the heel of the dam to zero at the toe of the dam. The resultants for the two extreme conditions assumed namely maximum flood of 6.5 feet and corresponding uplift and water at crest of dam, corresponding uplift and ice pressure as above noted are shown on the section of the dam on the submitted plans.

"The size of all cut-off walls, core walls and dam section let into the natural bed," I believe are all shown in detail on the plans and sections of the dam. Regarding the permeability of the natural bed of the proposed dam, I think this may well be gauged from the logs of the borings and test pits submitted with the application.

Yours very truly,

E. H. Sargent

ENGINEER.

EHS:R

COPY

MEMORANDUM GIVING BASIS OF DESIGN OF SPILLWAY OF CONKLINGVILLE DAM OF THE PROPOSED SACANDAGA RESERVOIR.

By

EDWARD H. SARGENT, ENGINEER,

HUDSON RIVER REGULATING DISTRICT.

The drainage area at the Conklingville dam site is 1,044 square miles. The flood of March 25th to 30th, 1913, was the greatest known in the history of the Sacandaga River, and fortunately an automatic recording gage was in operation at the stream gaging station maintained since 1907 by the U.S.G.S. a short distance below the dam site. A hydrograph of that flood which reached a maximum of 35,500 c.f.s. is shown on the attached photostat. The assumption in the design of the spillway capacity is a flood (outlined on the phostat) with a peak of 50,000 c.f.s., 40% greater than the peak of the 1913 flood. It has been assumed that the reservoir which has an area at the spillway crest of 1,160,000,000 square feet (26,600 acres) was full at the beginning of this flood. With these assumptions various length spillways of from 500 to 800 feet have been assumed and a study made of what the effect of storage in the reservoir above the spillway crest would have been on reducing the flood. Hydrographs have been computed and plotted showing the discharge and elevations reached during such a flood. From these studies it has been determined that the proper spillway length is 600 feet on which the maximum depth during the assumed maximum flood would be 6.45 feet. The proposed spillway elevation is at elevation 771 and the crest of the proposed earth dam is at elevation 795, a freeboard of 24 feet, which would give a clearance of over 17 feet above the maximum high water.

HUDSON RIVER REGULATING DISTRICT

CONKLINGVILLE DAM

The Conklingville dam will be an earth structure approximately 100 feet high founded upon the glacial drift with which the ancient valley is filled. The top of the dam is to be at elevation 795.0 with a top width of 40 feet; the upstream slopes varying from 3 to 1 at the top of the dam to 4 to 1 at the base and the downstream slope being 2 1/2 to 1 with 8 foot berms at elevations 775 and 745. The above slopes give a maximum bottom width of the dam of 600 feet.

The dam is to be constructed by the semi-hydraulic fill process, that is, the earth will be excavated from the properly designated borrow pits, transported in dump cars to the dam site and deposited in dikes above and below and parallel with the axis of the dam. The fine part of this earth will then be sluiced into the center of the dam to form an impervious core. The foundation of the dam will be excavated to a depth of at least five feet, and more if warranted by the conditions revealed, for a width of 300 feet. A cut-off trench about 20 feet deep and 50 feet wide will be excavated at the base of the center of the dam and a cut-off trench will be excavated where the dam joins the side hill.

Several test pits have been excavated in the area in which it is proposed to locate the borrow pits out of which the material will come for the main dam. Analyses made of this material indicate that it is exceptionally well-fitted for earth dam construction and that there will be available ample material of an effective diameter of 0.01 millimeters for the core of the dam. The dam has been designed so that the core which will have a top width at elevation 750 of 30 feet and a bottom width of 140 feet is of sufficient cross-section to render the dam impermeable.

The upstream slope of the dam will be rip-rapped between elevations 730 and 795 and the downstream toe protected from erosion from any back wash of the spillway discharge by placing the rock spoil from the excavation of the spillway channel at the foot of the dam and up to elevation 730.

Spillway

The spillway will consist of a concrete gravity type dam 600 feet long extending upstream from the dam. The water will be led away from the spillway to the riverbed below the dam in a discharge channel cut in the ledge rock as shown on the plans. A memorandum giving the basis of design of the spillway has been submitted to and approved by the State Engineer. In brief this basis is as follows: The drainage area at Conklingville dam site is 1,044 square miles. The flood of March 25th to 30th, 1913 was the greatest known in the history of the Sacandaga River and reached a peak of 35,500 cubic feet per second. The assumption in the design of the spillway capacity is a flood with a peak of 50,000 cubic feet per second and it was further assumed that the reservoir was full at the beginning of the flood. Under such assumptions the flood would have reached a maximum depth of the 600 foot spillway of 6.45 feet. It is pertinent to note that should a flood equal to the famous Miami River flood occur with the reservoir full, the water would reach a depth of less than 10 feet on the spillway crest, leaving a freeboard of over 14 feet.

Log-Way

The plans of the dam and spillway provide for a log-way or chute for passing the logs from the reservoir to the river below the dam. The log-way is located in an extension of the spillway at its extreme westerly end.

Highways At Dam

It is proposed to construct a highway on the dam connecting the existing highway routes on both sides of the river. The highway on the dam will cross the spillway channel on a concrete arch bridge.

Outlet Works

The regulated flow from the reservoir will be withdrawn through a gate-house located in the reservoir about 300 feet above the northerly end of the main dam and thence discharged through an outlet tunnel 24 feet in diameter by passing the main dam into the river below. This tunnel will also serve as a diversion tunnel to take care of the flow of the river during the construction period. The gate-house will include six caterpillar sluice gates 12 feet, 6 inches by 8 feet with a discharging capacity at the low flow line (elevation 740) of 5,000 cubic feet per second. A bridge will connect the gate-house to the mainland.

Both an automatic recording gage and a staff gage will be installed in the gate-house in order that a careful record can be kept of the fluctuation of the water surface of the reservoir.

E. H. Sargent
Engineer to the Board

STATE OF NEW YORK
STATE ENGINEER AND SURVEYOR
ALBANY

ADDRESS ALL COMMUNICATIONS TO
ROY G. FINCH, STATE ENGINEER

ROY G. FINCH
STATE ENGINEER
FRANK R. LANAGAN
DEPUTY
THOS. L. WATKINS
ASSISTANT DEPUTY

COPY FOR MR. McKIM

FRL-BW

July 14, 1926.

Mr. Edward H. Sargent, Chief Engineer,
Board of Hudson River Regulating District,
44 Howard Street,
Albany, New York.

Dear Sir:

Receipt is acknowledged of your letter of July 12th, together with a sample from ledge rock proposed as a quarry for crushed stone to be used in first-class concrete in connection with the construction of the Sacandaga Reservoir.

In reply to your inquiry as to whether this stone, when properly crushed and screened, would be suitable for use in such concrete, you are advised that it should be satisfactory except in concrete subject to high temperatures such as resulting from exposure to fire.

The sample of rock submitted is of the general type of Adirondack granite. It is composed mainly of quartz, feldspar, hornblend and garnet. Because of the relatively large percentage of hornblend, it might be called a "hornblende-granite". The rock sample is hard and dense with a specific gravity indicating a weight of 168 pounds per cubic foot.

Very truly yours,

Roy G. Finch,
State Engineer.

By

Deputy State Engineer.

Copy for Mr. McKim

November 24, 1926.

Dam 415 U. Hudson
Conklingville

The Board of Hudson River Regulating District,
44 Howard St.,
Albany, N. Y.

Gentlemen:

There has been submitted to the State Engineer by your Chief Engineer Edward H. Sargent, application and 4-drawings marked A00 2014, 2015, 2016 and 2017, for a revised design of the Conklingville dam on the Sacandaga river, which dam is designated by this department as dam No. 415 Upper Hudson watershed.

You are hereby given permission to November 1st, 1929 insofar as the matter involves the jurisdiction conferred upon this office by chapter 647, laws of 1911, section 48, as amended, to construct the above dam according to the submitted drawings, under the following conditions:

(1) That our Albany Division Engineer Mr. R. D. Hendricks, be notified a week in advance of the date when any section of the bed will be excavated and ready for the construction of the puddled core or the concrete work.

(2) That your engineer submit a report to this department on each section of the bed and banks of the above dam as soon as a section is prepared for the foundation concerning the character of the natural bed upon or against which the section is to be constructed, the permeability and the methods taken to test same, and the dimensions of the excavations for the concrete sections and the cutoffs. If the soil under core cutoff is not impervious steps must be taken to prevent the passage of water in the finished structure.

(3) That two samples of a quart each of the hydraulic puddled core from the lowest 5 ft. thick section and from each subsequent 10 ft. section be forwarded the day following the completion of each section to the State Engineer's Laboratory, Hamilton Street and Broadway, Albany, N.Y., one sample to be taken from the center and one from the outside 1/3 of the core. These samples to be numbered serially with odd numbers for the center and even

Hudson River Regulating District

Sacandaga Reservoir

Analyses of Material [illegible]

December 192[illegible] [illegible]

BOARD OF HUDSON RIVER REGULATING DISTRICT
44 HOWARD STREET
ALBANY, N. Y.
TELEPHONES { MAIN 4260 / MAIN 2625

HENRY M. SAGE, PRESIDENT
ERSKINE C. ROGERS
ELLISON MILLS
[illegible] FITZGERALD, Jr.

RANULF COMPTON, Secretary-Treasurer
EDWARD H. SARGENT, Chief Engineer

November 16, 1926.

McKinn

Hon. Roy G. Finch, State Engineer and Surveyor,
Journal Building,
Albany, N. Y.

Dear Sir:

On March 4, 1924, the State Engineer and Surveyor by Mr. Arnold C. Chapman, Deputy State Engineer, approved the plans for the Conklingville Dam of the Sacandaga Reservoir which were submitted in accordance with the provisions of Section 22 [illegible] the Conservation Law.

Since that time further studies have been made as a result of which revised plans for the Conklingville Dam and appurtenances have been made, which in our opinion, will considerably reduce the cost of the dam and at the same time make it of a more conservative design.

We accordingly submit to you the following drawings:

General Plan of the Conklingville Dam - Accession 2614.

Typical Sections of the Conklingville Dam - Accession 2615.

Outlet Works of the Conklingville Dam - Accession 2615.

Spillway Details of the Conklingville Dam - Accession 2617.

The principal difference between the original and revised plans is in regard to the spillway. In the plans as originally submitted, the spillway was located upstream from the dam and was 600 feet long, whereas the revised plans show a spillway downstream from the dam with a length of 400 feet together with a siphon spillway of a maximum capacity of over 8,000 cubic feet per second.

The drainage area at the Conklingville Dam site is 1,044 square miles. The flood of March 25th-30th, 1913 was the greatest known in the history of the Sacandaga River and fortunately an automatic recording gauge was in operation at the stream gauging station maintained since 1907 by the U. S. G. S., a short distance below the dam site. Computation E-4 [illegible] shows a hydrograph of that flood which reached a 24-hour maximum of 33,500 c. f. s. and an absolute maximum of 35,500 c. f. s.

BOARD OF HUDSON RIVER REGULATING DISTRICT

44 HOWARD STREET
ALBANY, N. Y.
TELEPHONES { MAIN 4260 / MAIN 2625

[HE]NRY M. SAGE, PRESIDENT
[redacted]
W. ELLISON MILLS
[DA]VID J. FITZGERALD, Jr.

RANULF COMPTON
Secretary-Treasurer
EDWARD H. SARGENT
Chief Engineer

It may be pertinent to note that st[re]am flow records have been kept on the Hudson River at Mechanicville s[i]nce 1887 and the 1913 flood, which reached a maximum at Mechanicville of 120,000 c. f. s., was greater by 30,000 c. f. s. than any other flood during the period of the record. The 1913 flood reached an elevation in Albany greater than any other, records of flood heights having been kept at Albany for nearly a hundred years.

The assumption in the design of the spillway capacity is a flood (outlined on E-4005) with a peak of 50,000 c. f. s., forty percent greater than the peak of the 1913 flood. Moreove[r], it has been assumed that the Sacandaga Reservoir, which has an area at the spillway crest of 1,160,000,000 square fee[t] (26,600 acres), was full at the beginning of [t]his flood.

There is given below a table showing the maximum 24-hour floods for the Sac[and]aga River immediately b[el]ow the d[am] site for the years 1908 to 1924:

YEAR	MAXIMUM 24-hour FLOOD c. f. s.
1908	20,000
1909	19,700
1910	15,800
1911	9,080
1912	13,400
1913	34,500
1914	19,500
1915	10,900
1916	10,600
1917	12,600
1918	13,500
1919	11,500
1920	12,600
1921	11,500
1922	[illegible]
1923	[illegible]
1924	[illegible]

[Th]e average yearly flood over [th]is period of 17 years is 16,200 c. f. s [illegible] Fuller's formula (Tran[s]actions Am. Soc. [illegible]

BOARD OF HUDSON RIVER REGULATING DISTRICT
44 HOWARD STREET
ALBANY, N. Y.
TELEPHONES { MAIN 4260 / MAIN 2625

HENRY M. SAGE, PRESIDENT
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RANULF COMPTON
Secretary-Treasurer
EDWARD H. SARGENT
Chief Engineer

Volume LXXVII, Page 567), it has been computed that the assumed maximum flood of 60,000 c. f. s. is one that may be expected to occur once in 288 years.

The rise of the reservoir under the conditions of the 1913 flood and the assumed maximum flood is shown on Accession E-4006. Blue-prints of both these computation sheets are enclosed. With a 600 foot spillway as shown on the original plans, the assumed maximum flood would have caused the reservoir to rise to elevation 777.45. On Accessions W-344 and W-347 are shown respectively the rise of the reservoir under the 1913 flood and the assumed maximum flood conditions with the plans as revised. Under the latter conditions the water would have risen to a maximum elevation of 778.95. It will be noted on the plans that the spillway crest is at elevation 771.0 and the top of the main earth dam is at elevation 795.0, - a freeboard of 24 feet, so that under the assumed maximum flood conditions the top of the reservoir would be over 16 feet above the elevation of the reservoir. It might be noted that on the revised plans the spillway is located entirely on rock whereas on the original plans, part of the spillway section was located on hard pan.

It is thought that another improvement in the revised plans is the elimination of the tunnel which was provided in the original plan under the spillway channel and around the north end of the dam to carry the river flow during construction and acted as the permanent reservoir outlet with regulating gates at the tunnel entrance. In the revised plan, this tunnel is replaced by an open channel excavated in the rock hillside at the north end of the dam. After the completion of the dam, the outlet end of this diversion channel is to be plugged with a concrete structure containing the regulating gates and also containing two 6 ft. by 18 ft. siphon spillways. The upstream portion of this channel serves also as an approach channel to the spillway weir.

It is believed, also, that the revised plans show a much more economic design and location of the various appurtenances of the Conklingville Dam, particularly the gate house, logway, and the bridge over the spillway.

A further greater factor of safety is given in the revised plans in which we have provided for a rock fill at the downstream toe of the main dam to be carried up to elevation 745.0, which will furnish an even greater protection and stability than is shown on the original plans.

Respectfully submitted,

CHIEF ENGINEER.

Encls.
EHS:CP

Copy for Mr. McKim

November 24, 1926.

Dam 415 U. Hudson
Conklingville

The Board of Hudson River Regulating District,
44 Howard St.,
Albany, N. Y.

Gentlemen:

There has been submitted to the State Engineer by your Chief Engineer Edward H. Sargent, application and 4-drawings marked ACC 2614, 2615, 2616 and 2617, for a revised design of the Conklingville dam on the Sacandaga river, which dam is designated by this department as dam No. 415 Upper Hudson Watershed.

You are hereby given permission to November 1st, 1929 insofar as the matter involves the jurisdiction conferred upon this office by chapter 647, laws of 1911, section 28, as amended, to construct the above dam according to the submitted drawings, under the following conditions:

(1) That our Albany Division Engineer Mr. R. D. Hendricks, be notified a week in advance of the date when any section of the bed will be excavated and ready for the construction of the puddled core or the concrete work.

(2) That your engineer submit a report to this department on each section of the bed and banks of the above dam as soon as a section is prepared for the foundation concerning the character of the natural bed upon or against which the section is to be constructed, the permeability and the methods taken to test same, and the dimensions of the excavations for the concrete sections and the cutoffs. If the soil under core cutoff is not impervious steps must be taken to prevent the passage of water in the finished structure.

(3) That two samples of a quart each of the hydraulic puddled core from the lowest 5 ft. thick section and from each subsequent 10 ft. section be forwarded the day following the completion of each section to the State Engineer's laboratory, Hamilton Street and Broadway, Albany, N.Y., one sample to be taken from the center and one from the outside 1/3 of the core, these samples to be numbered serially with odd numbers for the center and [illegible]

numbers for the outside 1/3 samples.

This approval supersedes our approval of March 4, 1924 and shall not be deemed to authorize any invasion of property rights, either public or private in carrying out the above work nor to create any claim or demand against the State of New York; nor to authorize the flooding or use of State lands; nor to acquiesce in the flooding or use of such lands.

There is enclosed shipping tags numbered 200 to 206, inclusive, in order that you may ship to our laboratory for testing, besides the above samples of the puddled core, 1/2 a cu. ft., exclusive of any stones over 1/4 inch in size mixed therewith, of the sand to be used in the concrete of the above dam.

There is also enclosed the above four drawings with the approval of this department thereon.

Kindly acknowledge the receipt of this letter and of the drawings.

Yours very truly,

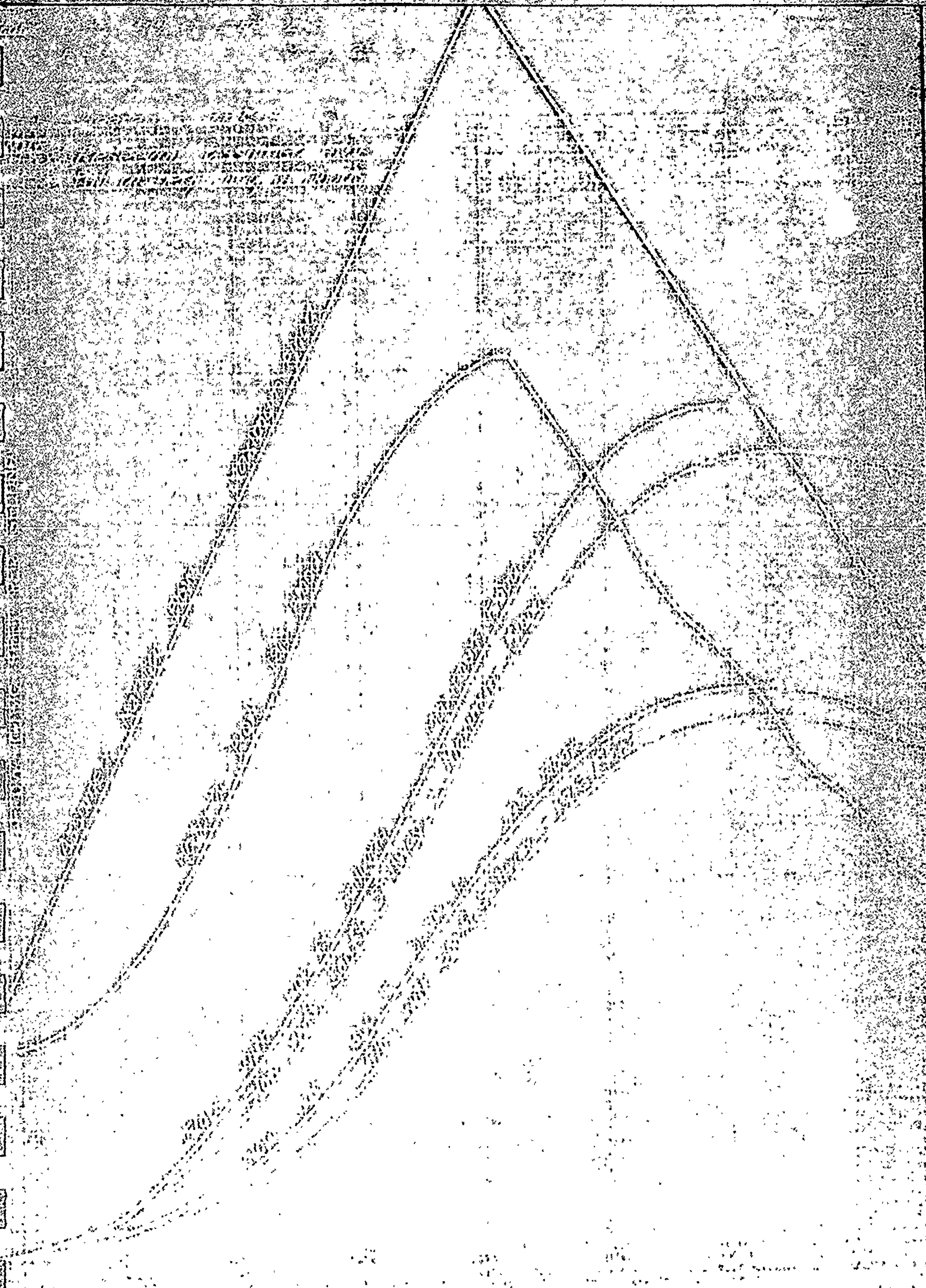
Roy G. Finch,
State Engineer.

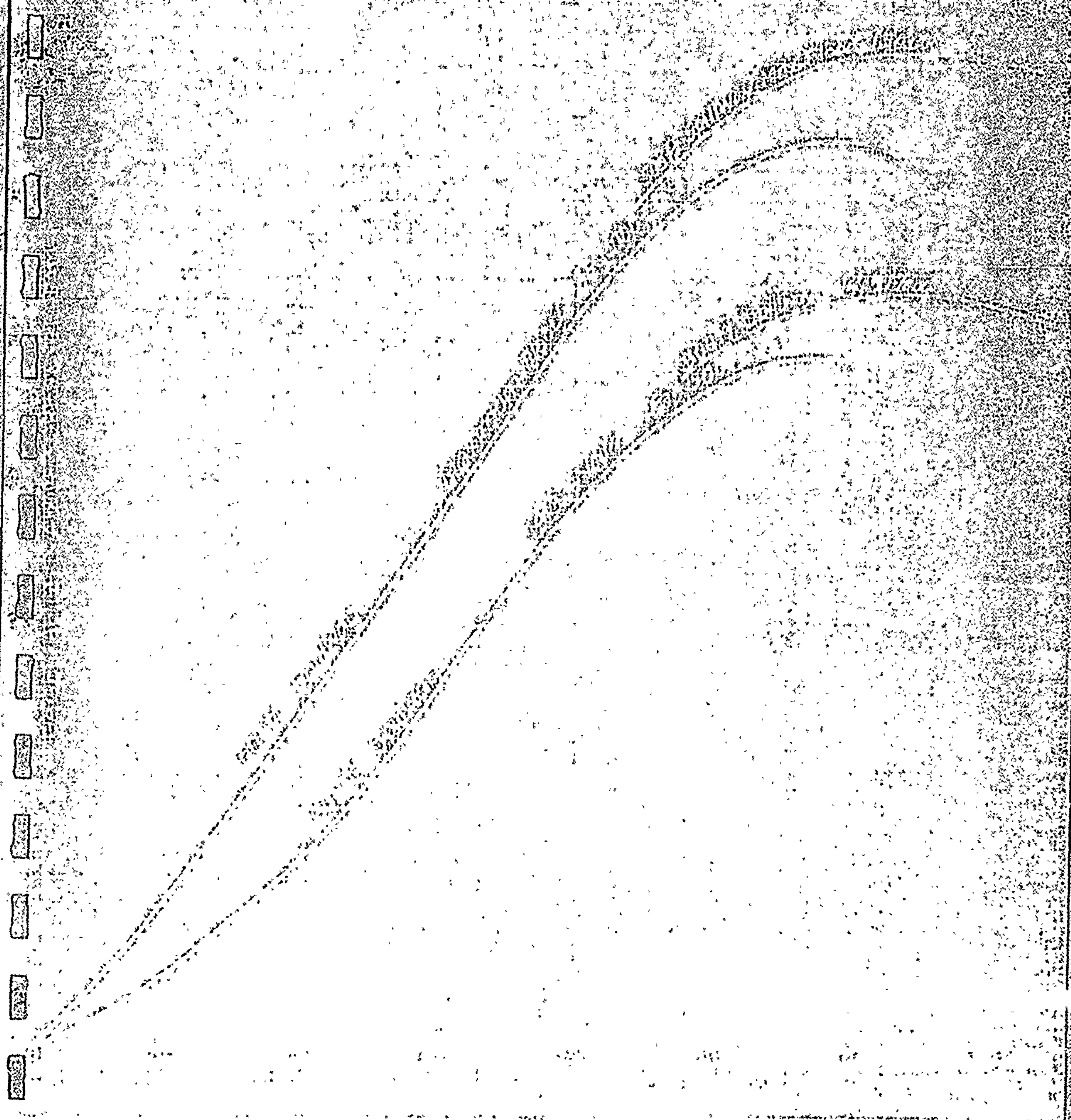
By Frank P. Lanagan
Assistant Deputy.

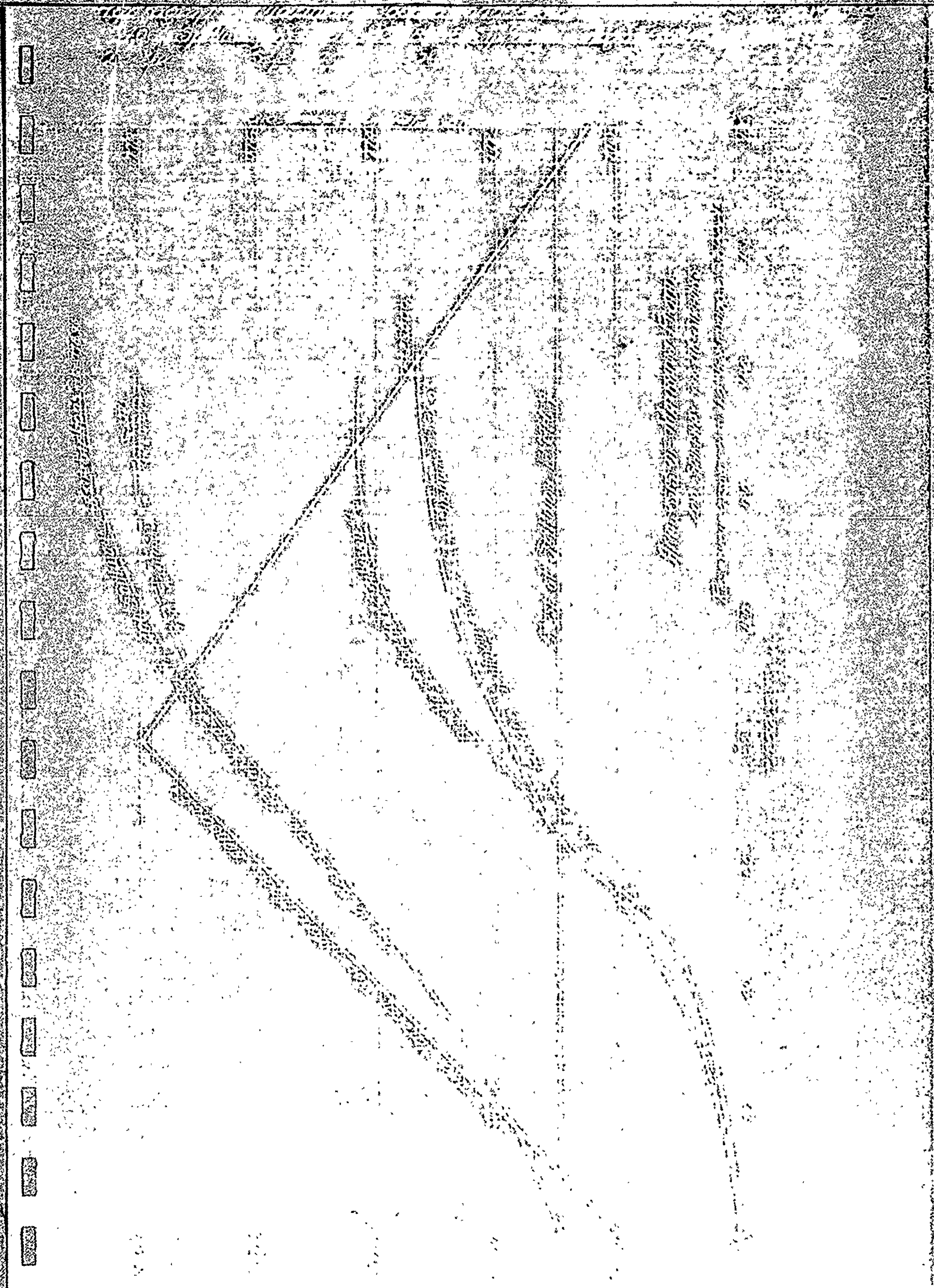
Copy and 4 prints to
Div.Engr.C.D.Hendricks

Copy to Sr.Asst.Engr. Greenman

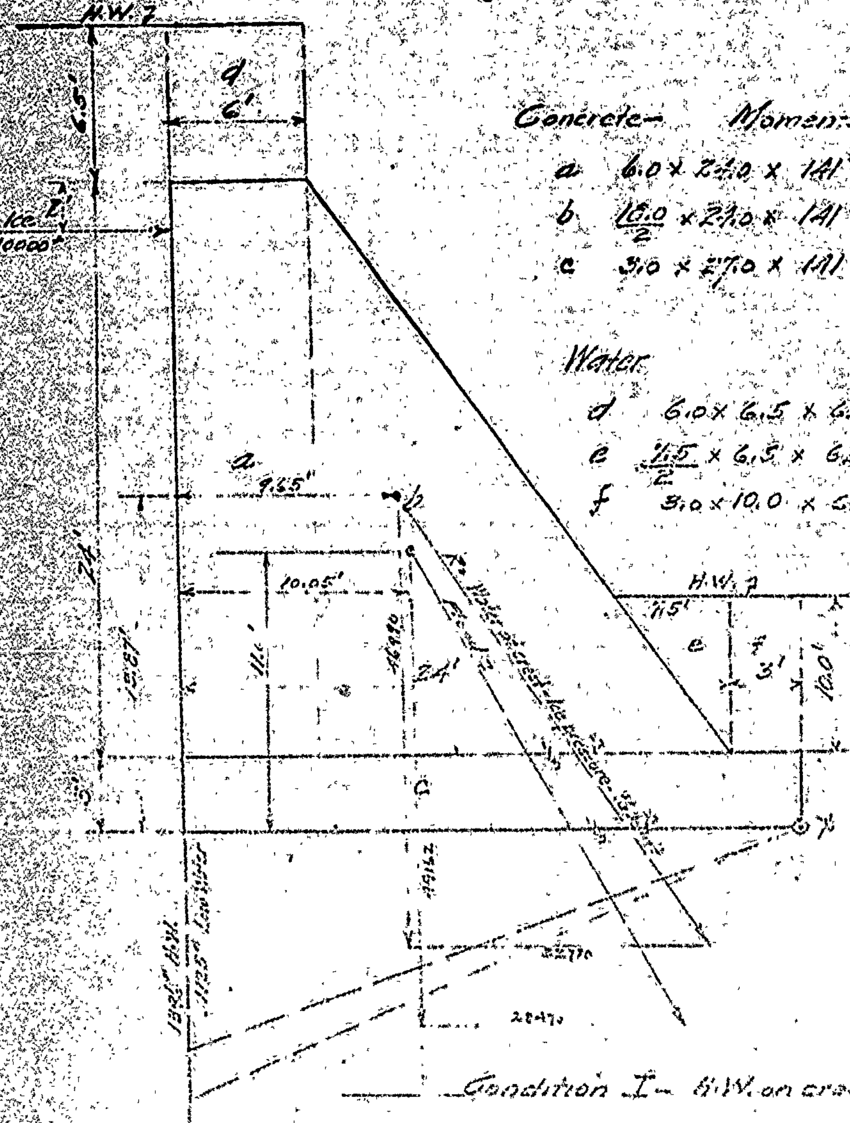
ARMcK/ECH







Stability Computations –
Conklingville Dam



Concrete – Moments about "X"

a $6.0 \times 24.0 \times 141^{\#} = 20304 \times 24.0 = 487296^{\prime\#}$
b $\frac{18.0}{2} \times 24.0 \times 141^{\#} = 30456 \times 15.0 = 456840$
c $3.0 \times 27.0 \times 141^{\#} = 11421 \times 13.5 = 154184$
62181 — 1098320

Water
d $6.0 \times 6.5 \times 62.5 = 2438 \times 24.0 = 58512$
e $\frac{11.5}{2} \times 6.5 \times 62.5 = 1524 \times 6.75 = 11300$
f $3.0 \times 10.0 \times 62.5 = 1875 \times 1.5 = 2815$
5837 — 72627

Condition I – H.W. on crest + Uplift

Concrete	=	62181#	1098320'#
Water	=	5837	72627
		68018	1170947
Uppressure $\frac{1396 \times 27.0}{2}$	=	−18846 × 18.0 =	−339228
		49162	831719

Water pressure – Overturning
$62.5 \times \overline{27}^2 \left(\frac{27}{6} + \frac{6.5}{2}\right)$ — $= + 353105$
478614

Water pressure – Resisting
$62.5 \times \frac{10^3}{6}$ — $= + 22880$
501494

$x = \frac{501494}{49162} = 10.\ldots$ from "X"

Computed by ...

Stability Computations
-Conklingville Dam-

Condition II - Water at crest elev. Ice pressure - Uplift

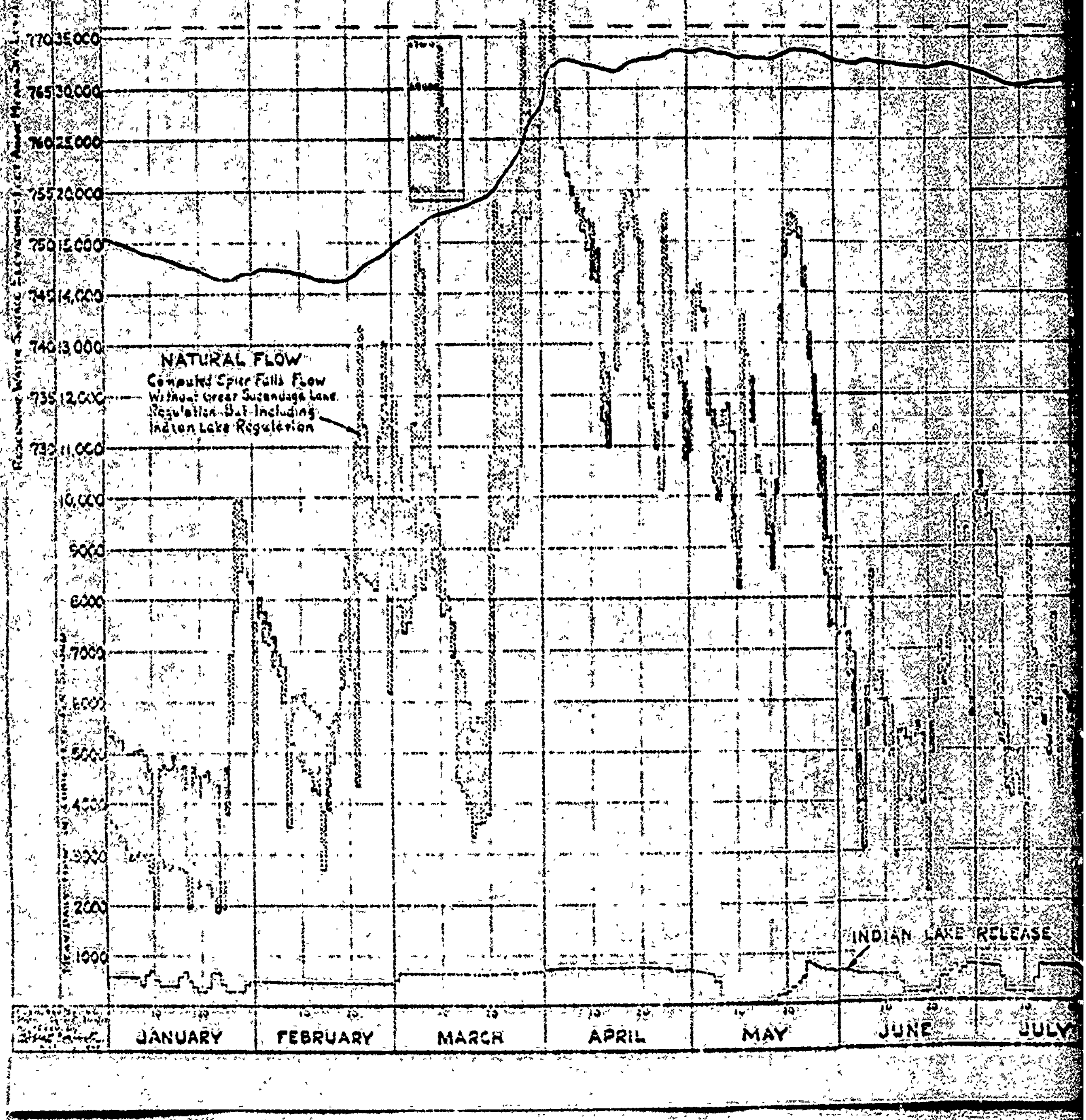
Concrete -	62181		1091320
Uppressure $\frac{112.5 \times 27.0}{2}$ =	-15188	$\times$ 18.0 =	-273384
	46993		814936
Ice pressure 10000 x 25			$= -250000$
			564936
Water pressure $62.5 \times \frac{27^3}{6}$			$= 205031$
			359905

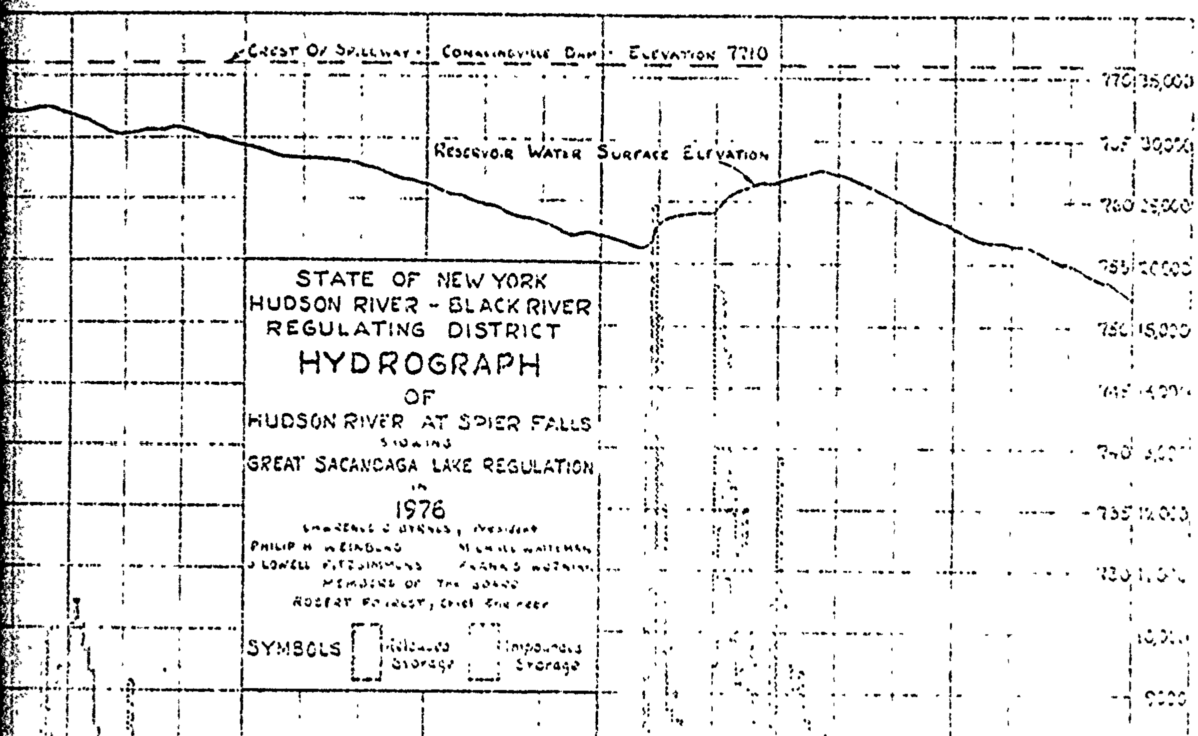
$$\bar{x} = \frac{359905}{46993} = 7.66'$$

Computed by D. Hall 5/32

APPENDIX E

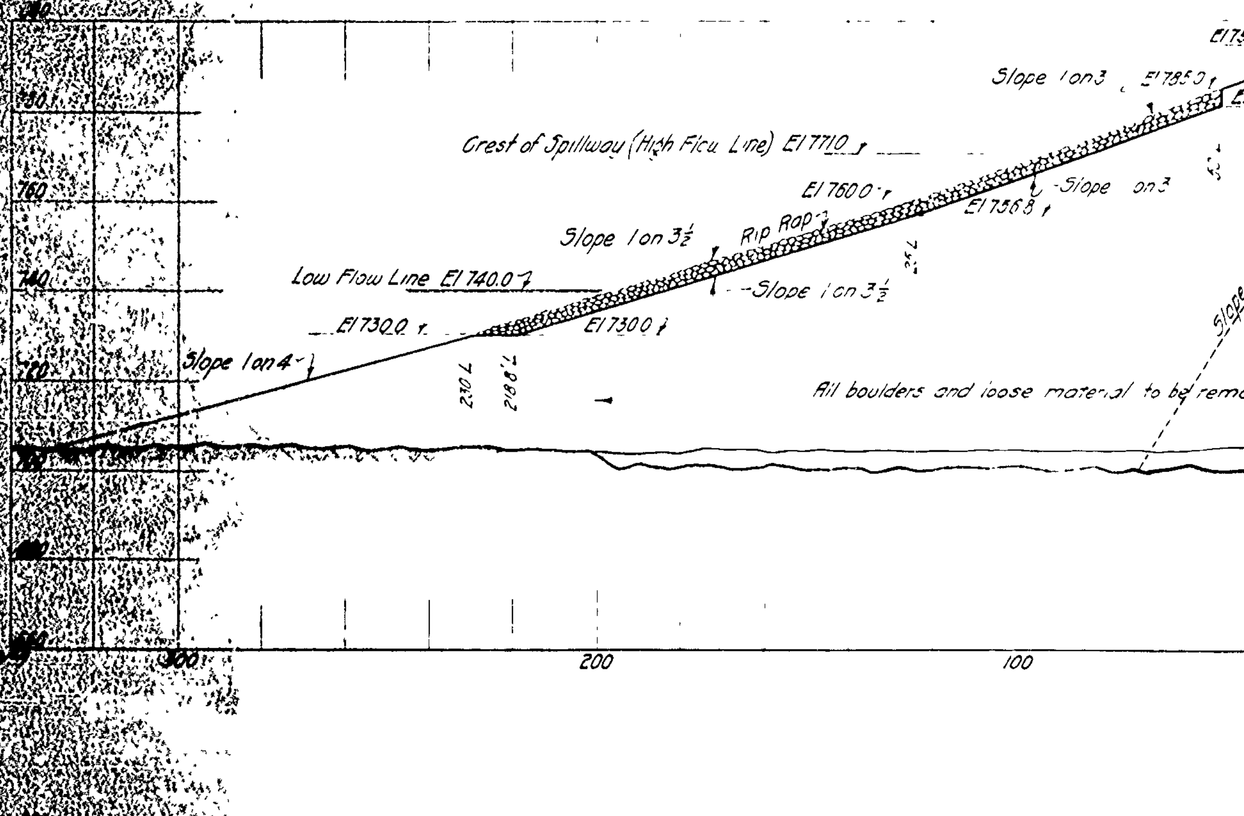
CONSTRUCTION DRAWINGS





STATE OF NEW YORK
HUDSON RIVER - BLACK RIVER
REGULATING DISTRICT
HYDROGRAPH
OF
HUDSON RIVER AT SPIER FALLS
GREAT SACANDAGA LAKE REGULATION
1976
SYMBOLS
Storage
Storage
Reservoir Water Surface Elevation
REGULATED FLOW
LAKE RELEASE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

2



PROPOSE

DESIGNING ENGINEER

The complete working drawings should give all the dimensions necessary for the calculations of the stability of the structure, and all the information asked for below under "Sketches." There may be attached to the plans any written reports, calculations, investigations or opinions that may aid in showing the data and method used by the designer.

21. SKETCHES. For small and unimportant structures, if plans have not been made, on the back sheet of this application make a sketch to scale for each different cross-section at the highest point; showing the height and the depth from the surface of the foundation, the bottom width, the top width (for a concrete or masonry spill at 18 inches below the crest), the elevation of the top in reference to the spillcrest, the length of the section, and the material of which the section is to be constructed. Mark each section with a capital letter. Also sketch a plan; show the above sections by their top lines, giving the mark and the length of each; the openings by their horizontal dimensions; and the abutments by their top width and top lengths from the upstream face of the spillcrest and give the elevation of the top in reference to the spillcrest.

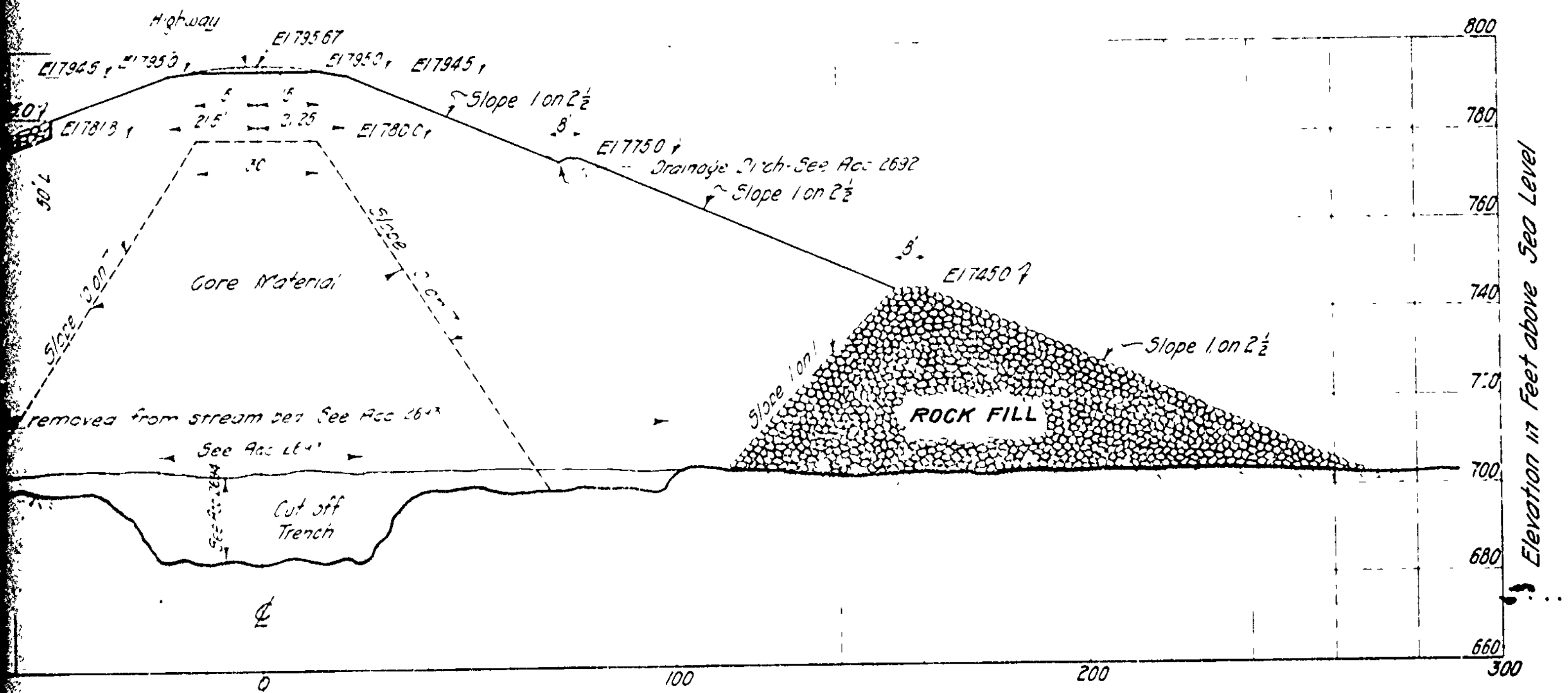
22. ELEVATIONS. Also give the elevations, if possible from the Mean Sea Level, of at least two permanent Bench Marks; of the spillcrest for any existing dam on the proposed dam site, at the middle and at both ends of the spill; and of the spillcrest for the above proposed dam.

23. SAMPLES. When so instructed, send samples of the materials to be used in the construction of the proposed dam, using shipping tags which will be furnished. For sand one-half a cubic foot is desired; for cement, three pints; and for the natural bed, twenty cubic inches.

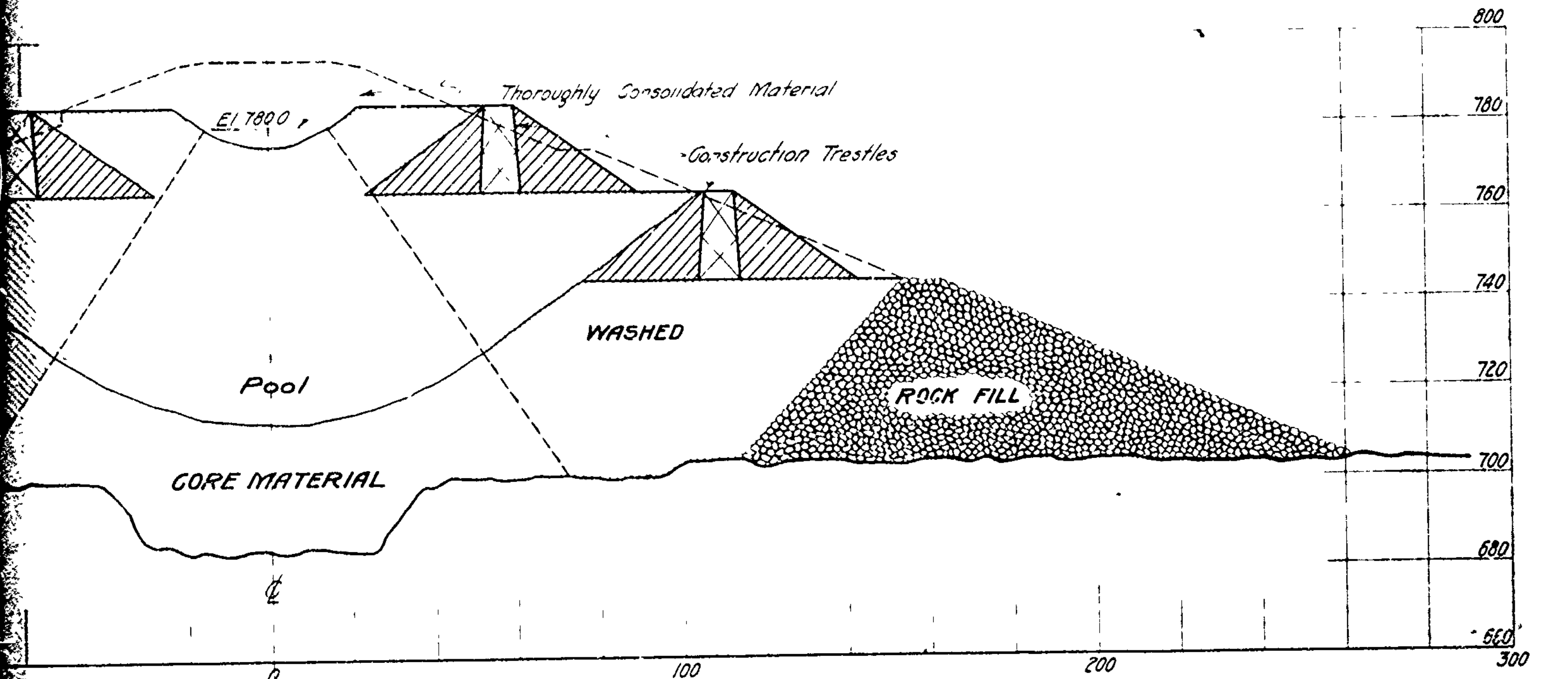
24. INSPECTION. State how inspection is to be provided for during construction

Construction to be carried out under careful inspection of resident engineer, chief engineer and consulting engineer.

10



TYPICAL SECTION



POSED CONSTRUCTION METHOD

2

CONSULTING ENGINEER

CONTRACT 4

SHEETS IN SET

Notes

As stated in the specifications, modification of the proposed method of depositing material in the dikes may be used if approved by the Engineer.

The location of the core and the dimensions of the areas of the washed and unwashed materials shown on this plan may be changed to suit borrow pit conditions

STATE OF NEW YORK
HUDSON RIVER REGULATING DISTRICT

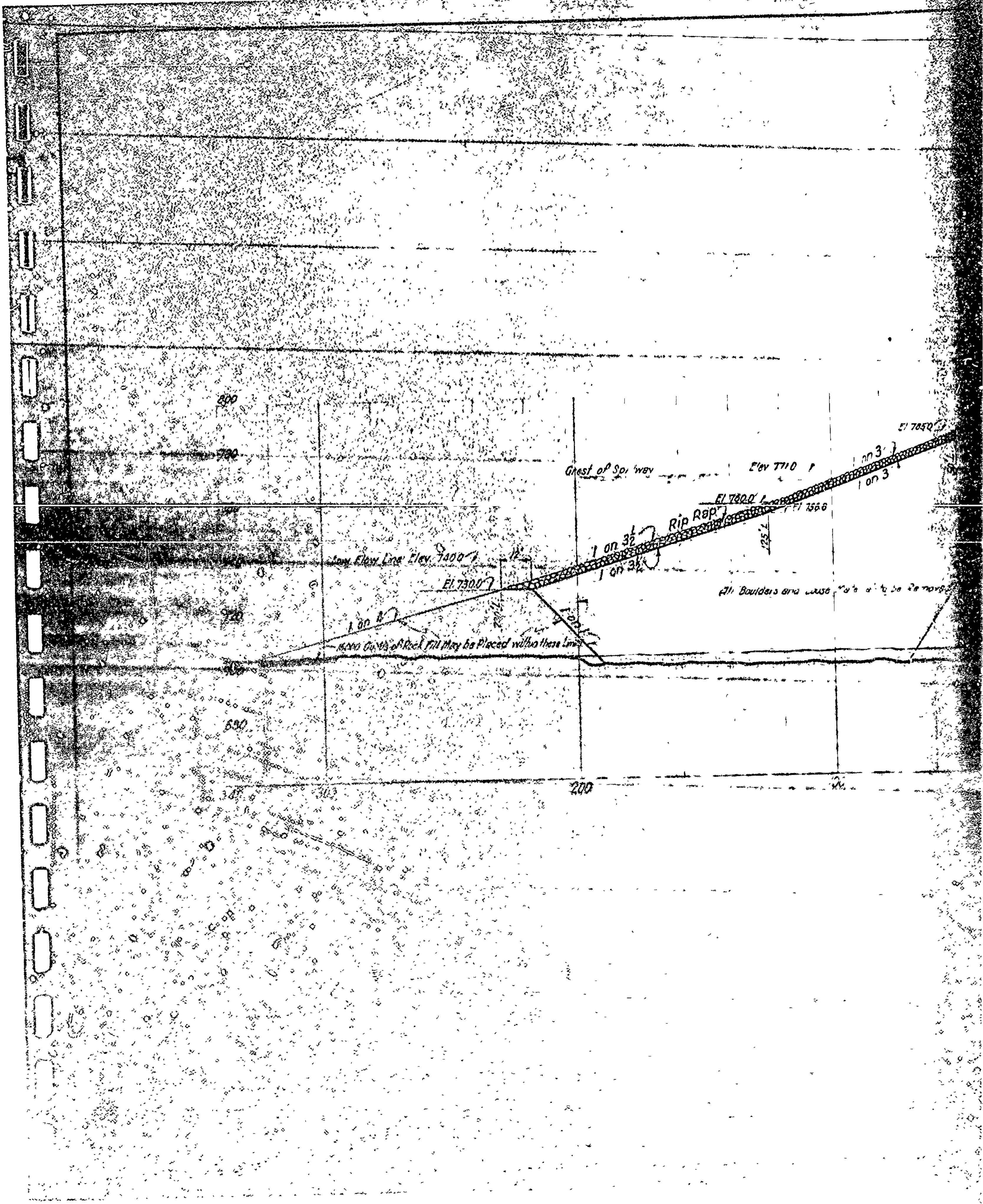
SACANDAGA RESERVOIR

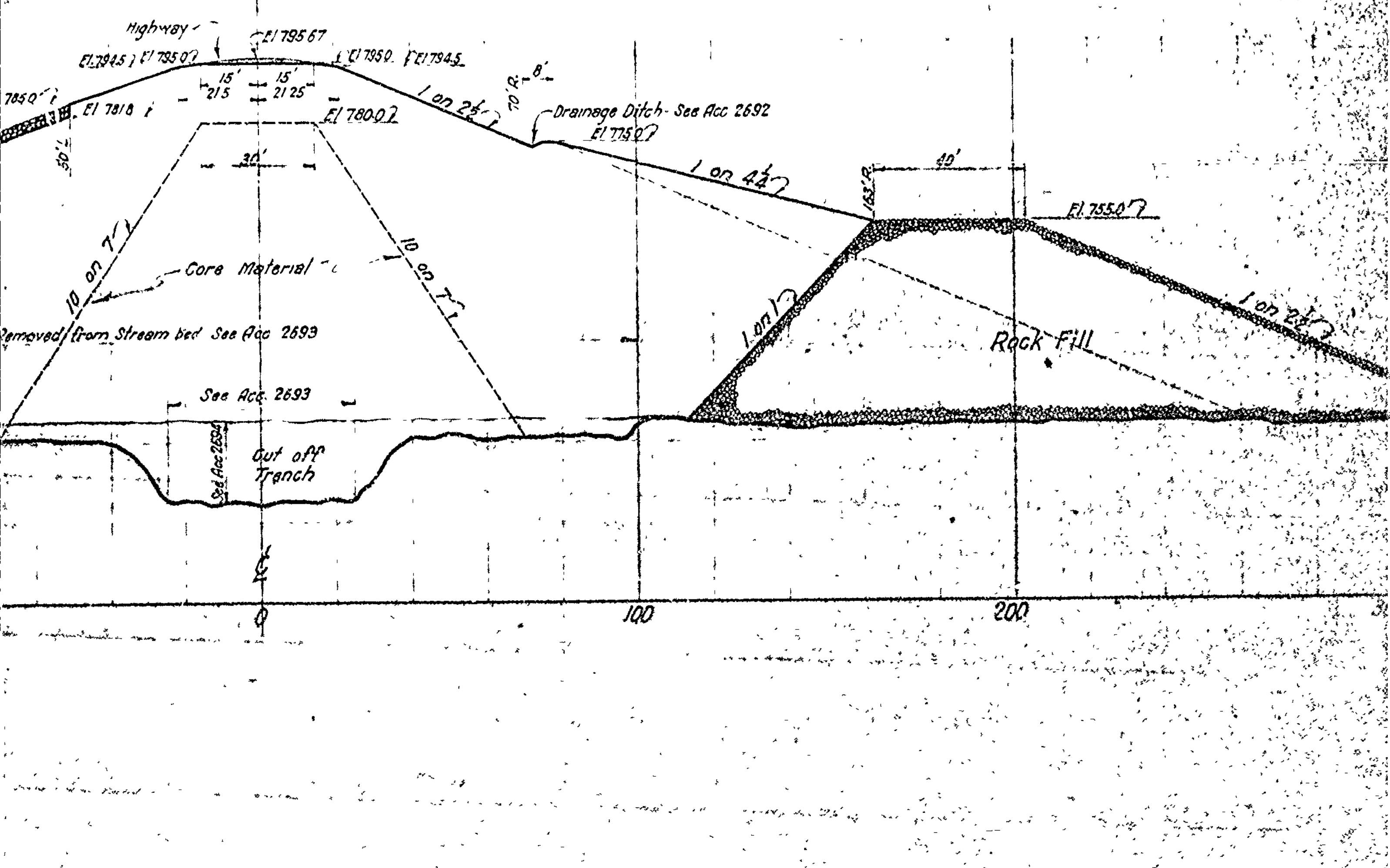
CONKLINGVILLE DAM

3

TYPICAL SECTIONS

SEPT. 1927


El 785.0
1 on 3
1 on 3
Crest of Spillway
Elev 771.0
El 760.0
El 756.8
Rip Rap
1 on 3½
1 on 3¼
Low Flow Line Elev 740.0
El 730.0
1 on 4
of Rock Fill May be Placed within these Limits
All Boulders and
800
720
680
200

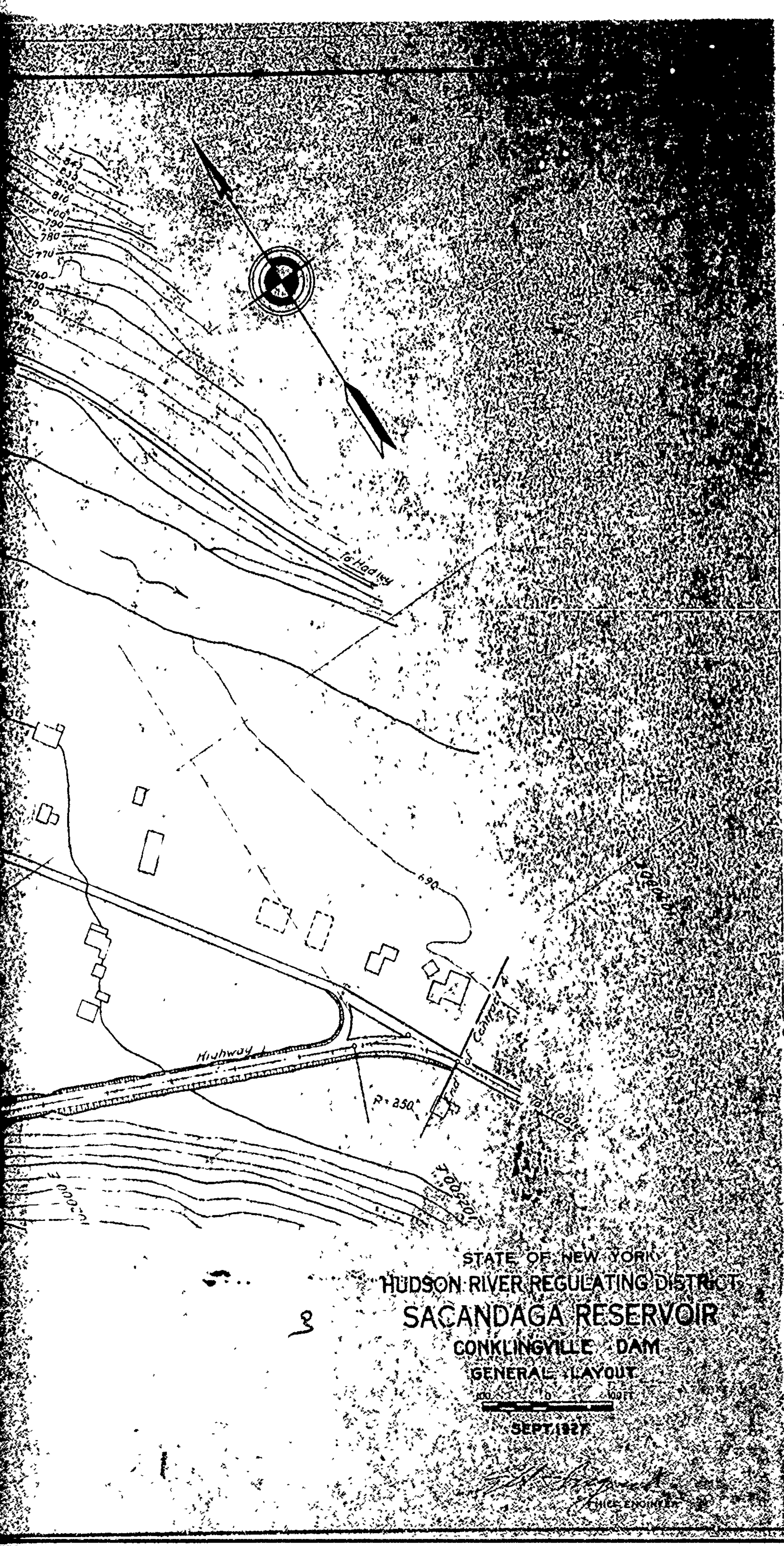


Highway
El 795.67
El 794.5
El 795.0
El 795.0
El 794.5
785.0
El 781.8
15'
21.5
15'
21.25
El 780.0
30'
50'
1 on 2½
70' R
8'
Drainage Ditch - See Acc 2692
El 775.0
1 on 4½
40'
El 755.0
10 on 7
Core Material
10 on 7
Removed from Stream bed See Acc 2693
1 on 1
Rock Fill
1 on 2½
See Acc. 2693
See Acc 2694
Cut off Trench
0
100
200

800
780
760
740
720
700
680
1 on 2½
Elevation in Feet above Sea Level
300
100

Melvin D. Casler
DESIGNING ENGINEER

Spillway
Channel
Spillway Weir
End of Cofferdam
Logway
Outlet
Channel
Outlet Structure
Drainage Ditch
Rock Fill
Seeded
Downstream line of Dam
Existing Highway
RIVER
Iron Pin
95500 N
99000 N
CONSULTING ENGINEER



To Hadley
Highway
R = 350'
690
10,500 E
10,000 E
STATE OF NEW YORK
HUDSON RIVER REGULATING DISTRICT
SACANDAGA RESERVOIR
CONKLINGVILLE DAM
GENERAL LAYOUT
100 0 100 FT.
SEPT. 1927
CHIEF ENGINEER

STATE OF NEW YORK

HUDSON RIVER REGULATING DISTRICT

SACANDAGA RESERVOIR

CONKLINGVILLE DAM

CONTRACT DRAWINGS FOR CONTRACT 4

CONSISTING OF 32 SHEETS NUMBERED ACC. 2687 TO ACC. 2718 INCLUSIVE

HENRY M. SAGE, PRESIDENT.

DAVID J. FITZGERALD JR., W. ELLISON MILLS,

MEMBERS OF THE BOARD.

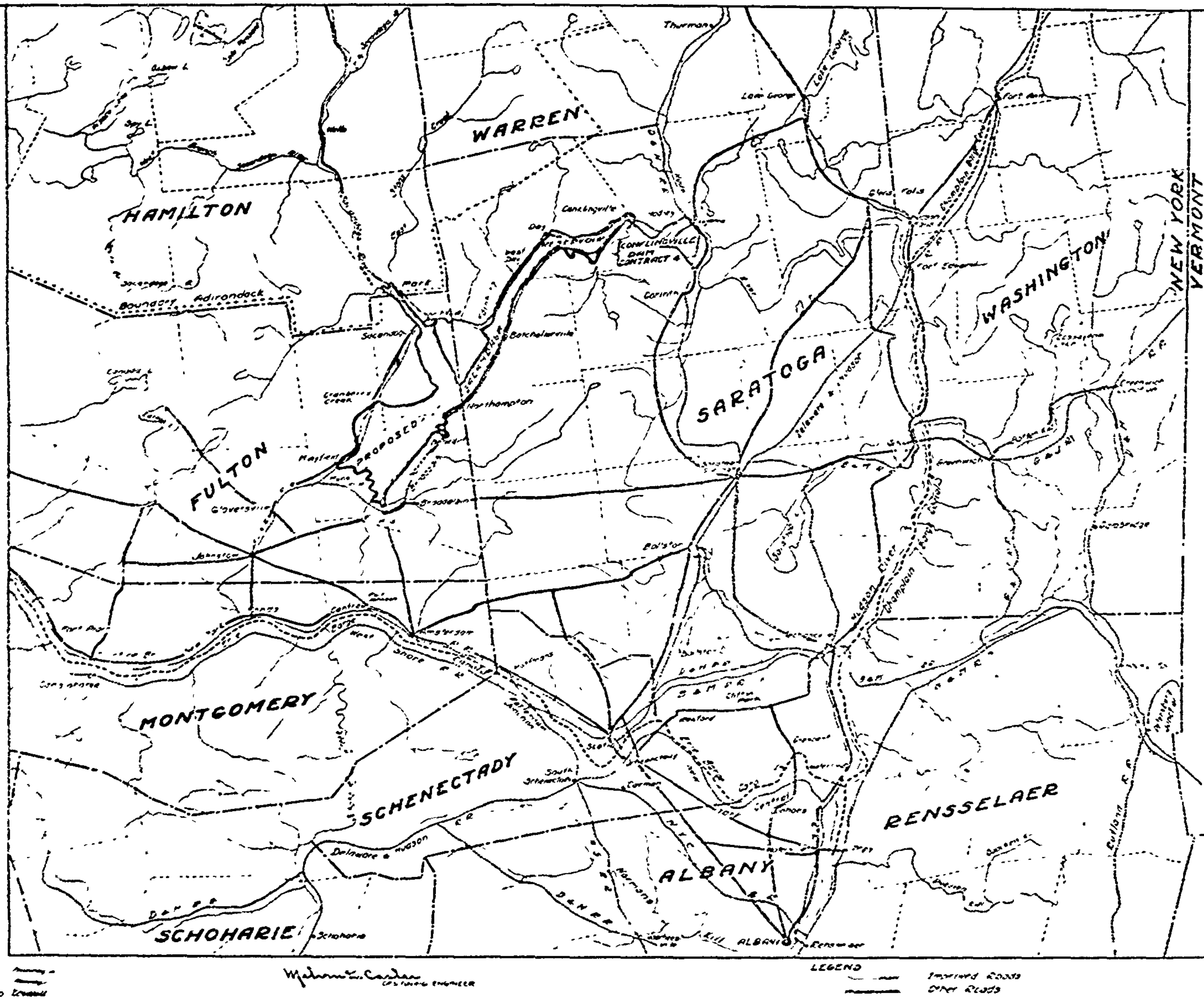
RANULF COMPTON, SECRETARY. EDWARD H. SARGENT, CHIEF ENGINEER.

CHARLES W. WALTON, COUNSEL.

ALBERT S. CRANE, FRANK M. WILLIAMS, CONSULTING ENGINEERS.

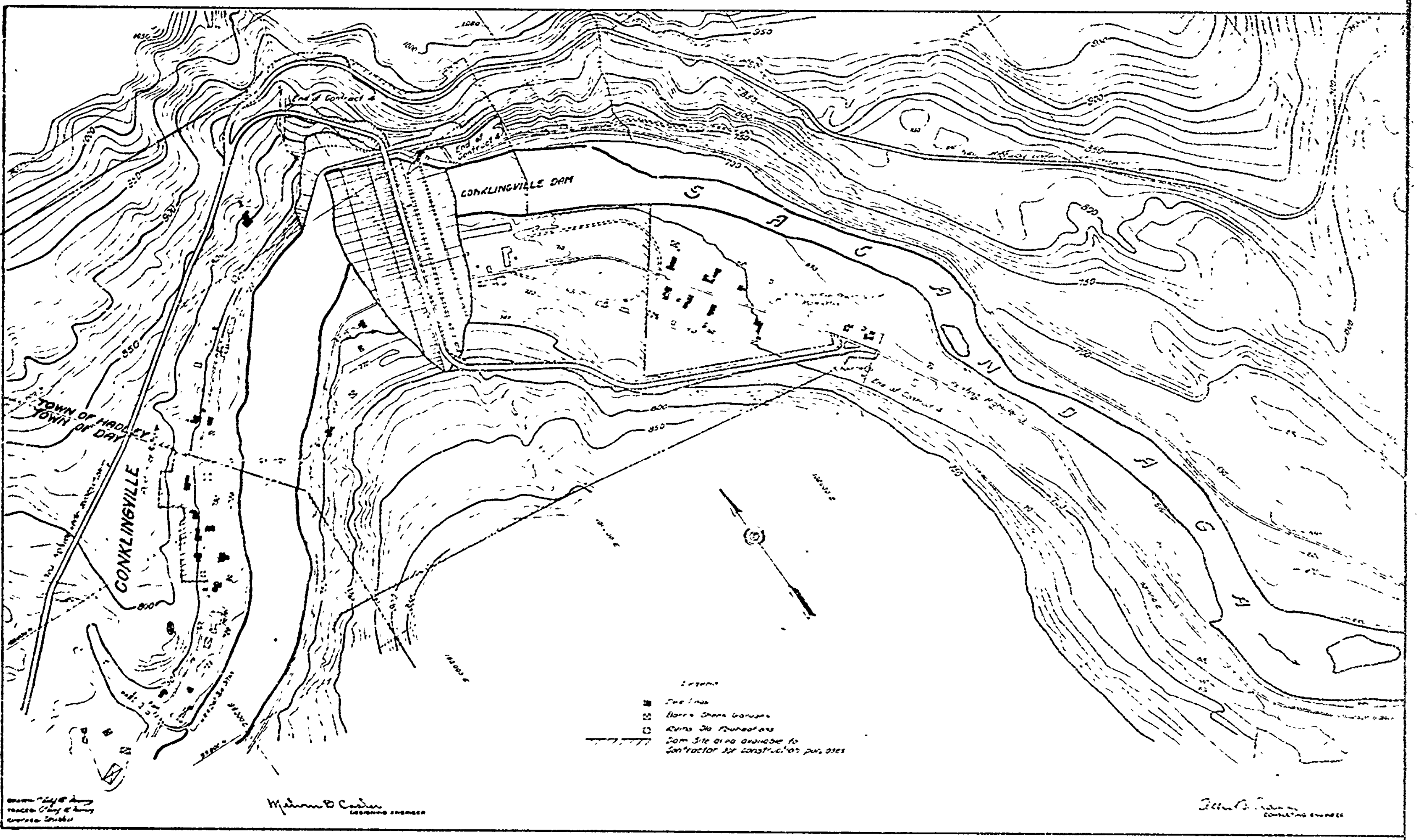
APPROVED BY RESOLUTION OF THE BOARD OF HUDSON RIVER REGULATING DISTRICT [signature] SECRETARY.

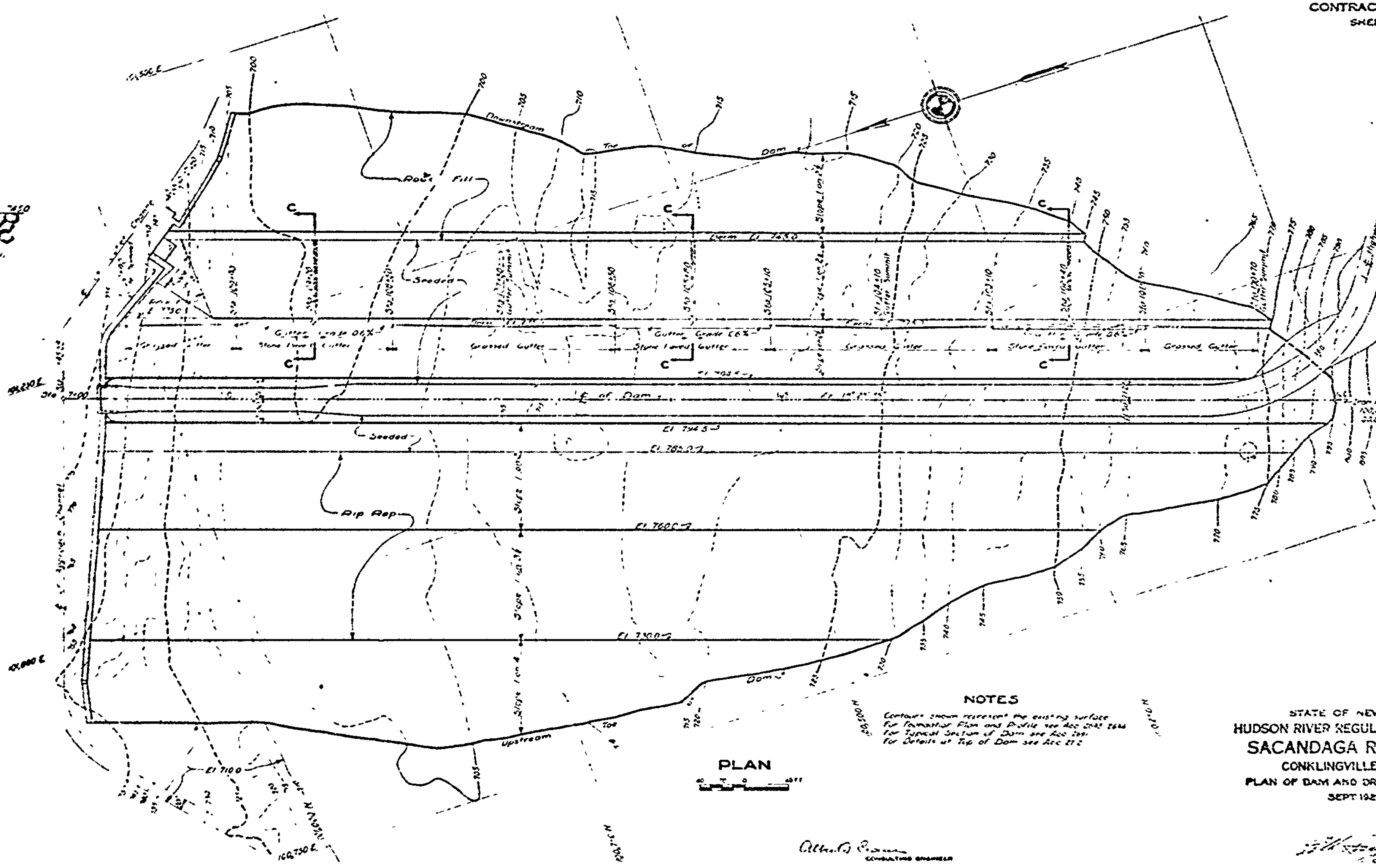
FILE



111

ACC Nº	SHEET Nº	
2687	1	Title Shee[t]
2688	2	Location
2689	3	Topography
2690	4	[illegible]
2691	5	[illegible]
2692	6	Plan of [illegible]
2693	7	[illegible]
2694	8	Profile and
2695	9	General
2696	10	[illegible]
2697	11	Approach
2698	12	Approach
2699	13	[illegible]
2700	14	[illegible]
2701	15	[illegible]
2702	16	[illegible]
2703	17	[illegible]
2704	18	[illegible]
2705	19	[illegible]
2706	20	[illegible]
2707	21	[illegible]
2708	22	[illegible]
2709	23	[illegible]
2710	24	Highway
2711	25	Highway
2712	26	Highway
2713	27	Highway
2714	28	Highway
2715	29	Highway
2716	30	Highway
2717	31	Highway
2718	32	Misce[llaneous]


CONKLINGVILLE DAM
SACANDAGA
CONKLINGVILLE
TOWN OF HADLEY
TOWN OF DAY
End of Contract 4
Legend
Dam Site area available to Contractor for construction purposes
Designing Engineer
Consulting Engineer



NOTES

Contours shown represent the existing surface
For Foundation Plan and Profile see Acc [illegible]
For Typical Section of Dam see Acc [illegible]
For Details at Top of Dam see Acc [illegible]

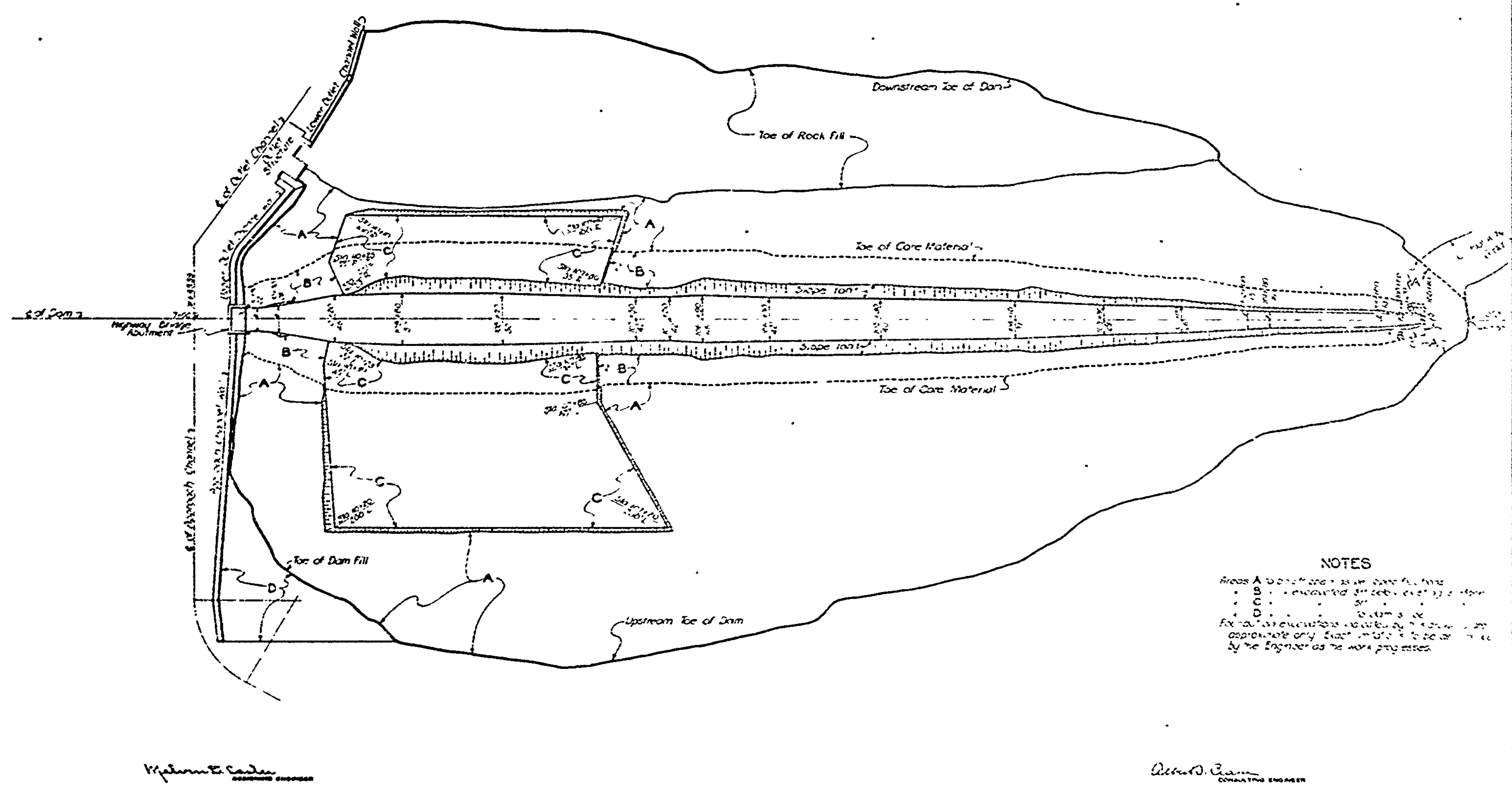
STATE OF NEW YORK
HUDSON RIVER REGULATING DISTRICT
SACANDAGA RESERVOIR
CONKLINGVILLE DAM
PLAN OF DAM AND DRAINAGE DETAILS
SEPT 1927

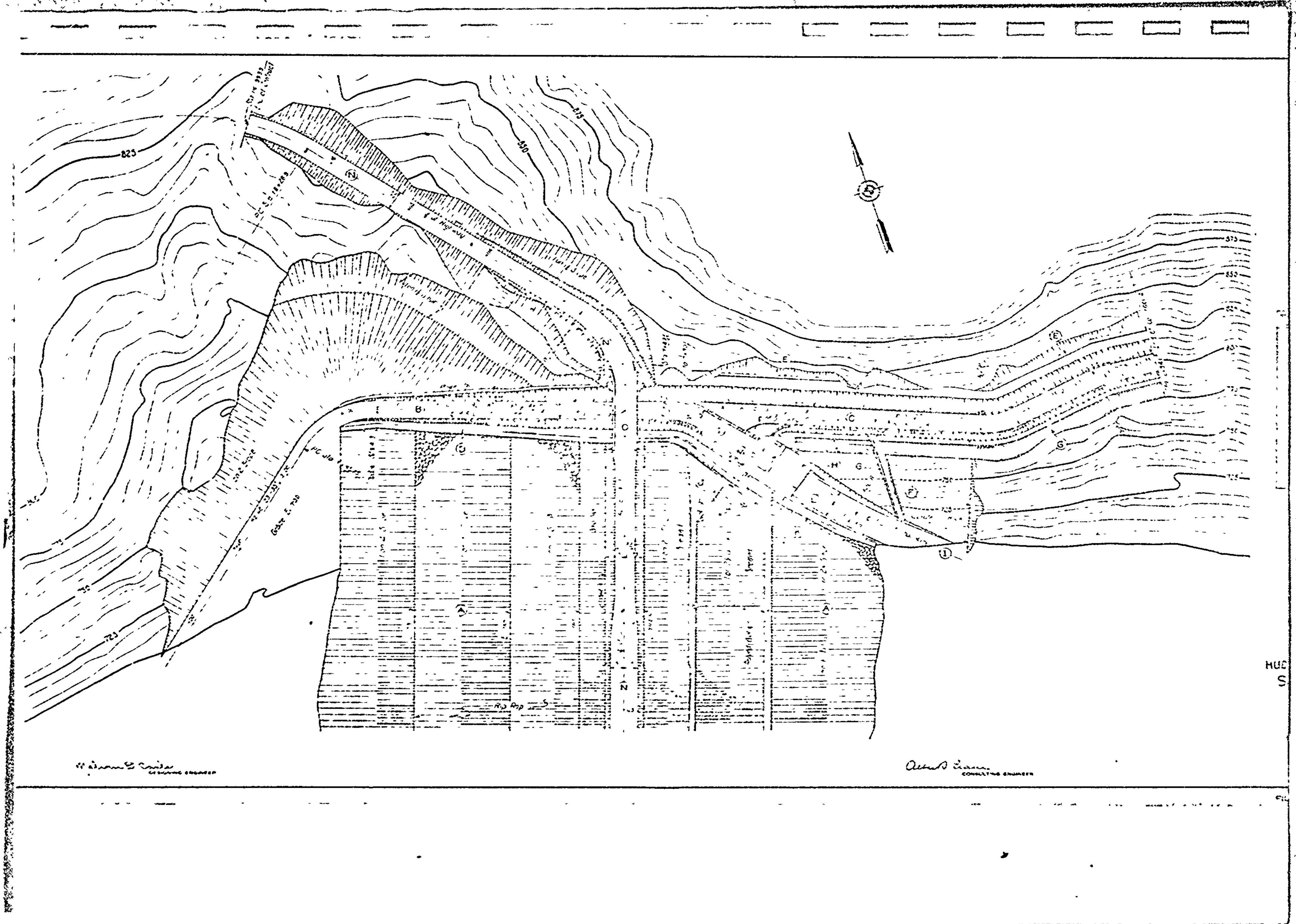
CONSULTING ENGINEER

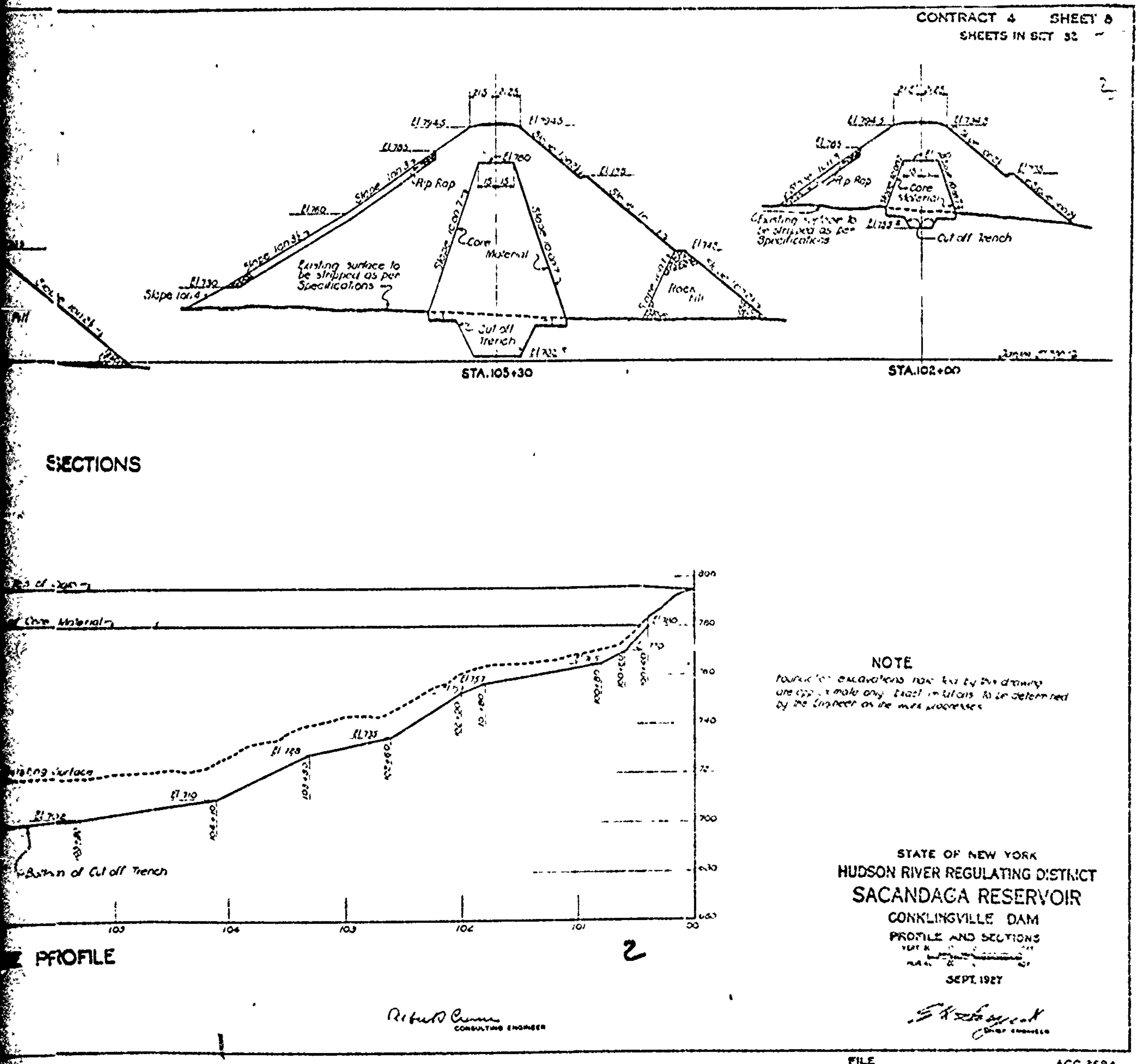
CHIEF ENGINEER

FILE ____

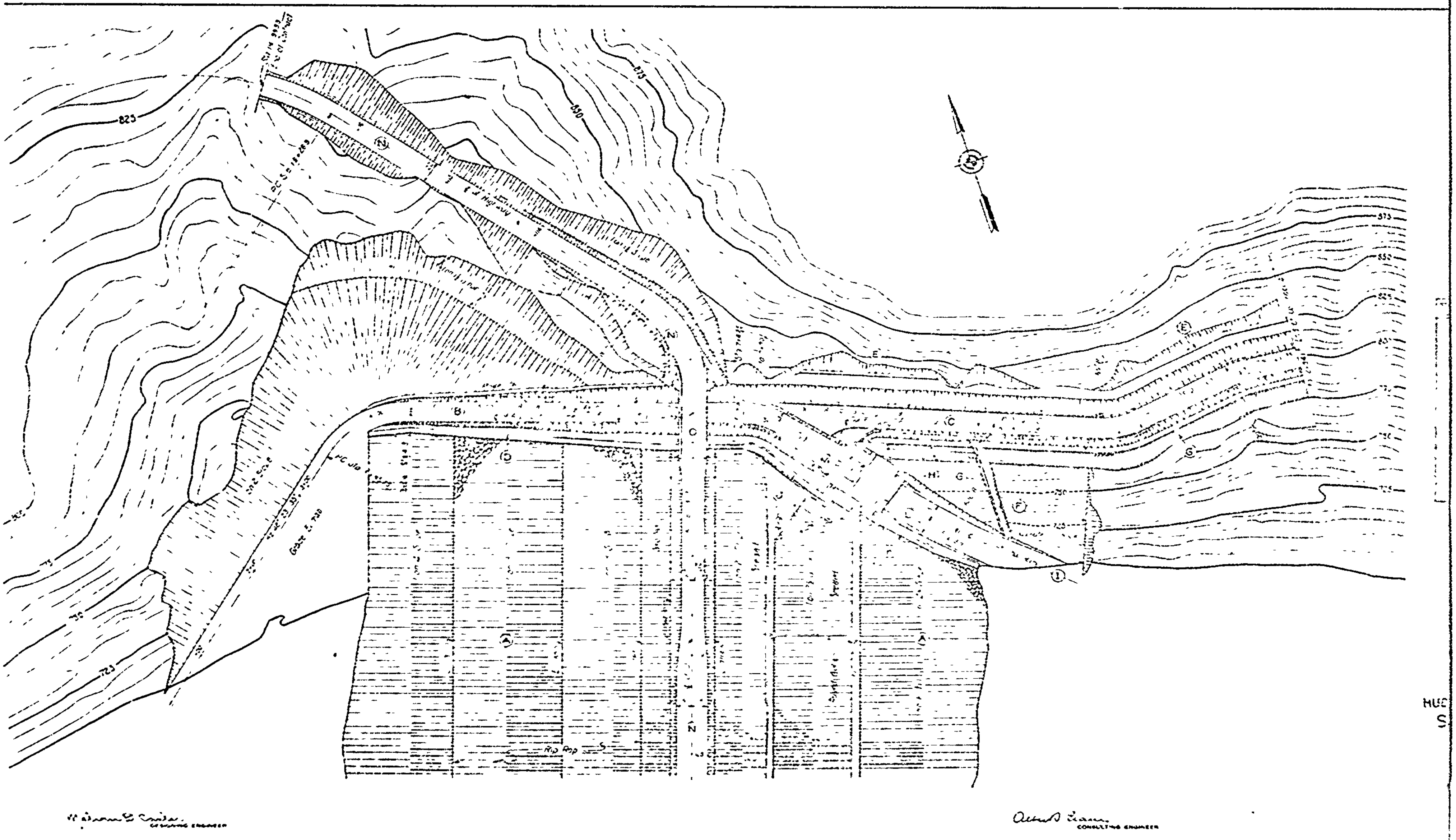
ACC. 2632


Downstream Toe of Dam
Toe of Rock Fill
Toe of Core Material
Slope 1on1
Slope 1on1
Toe of Core Material
Highway Bridge Abutment
Toe of Dam Fill
Upstream Toe of Dam
A
B
C
D
NOTES
approximate only
by the Engineer as the work progresses
DESIGNING ENGINEER
CONSULTING ENGINEER

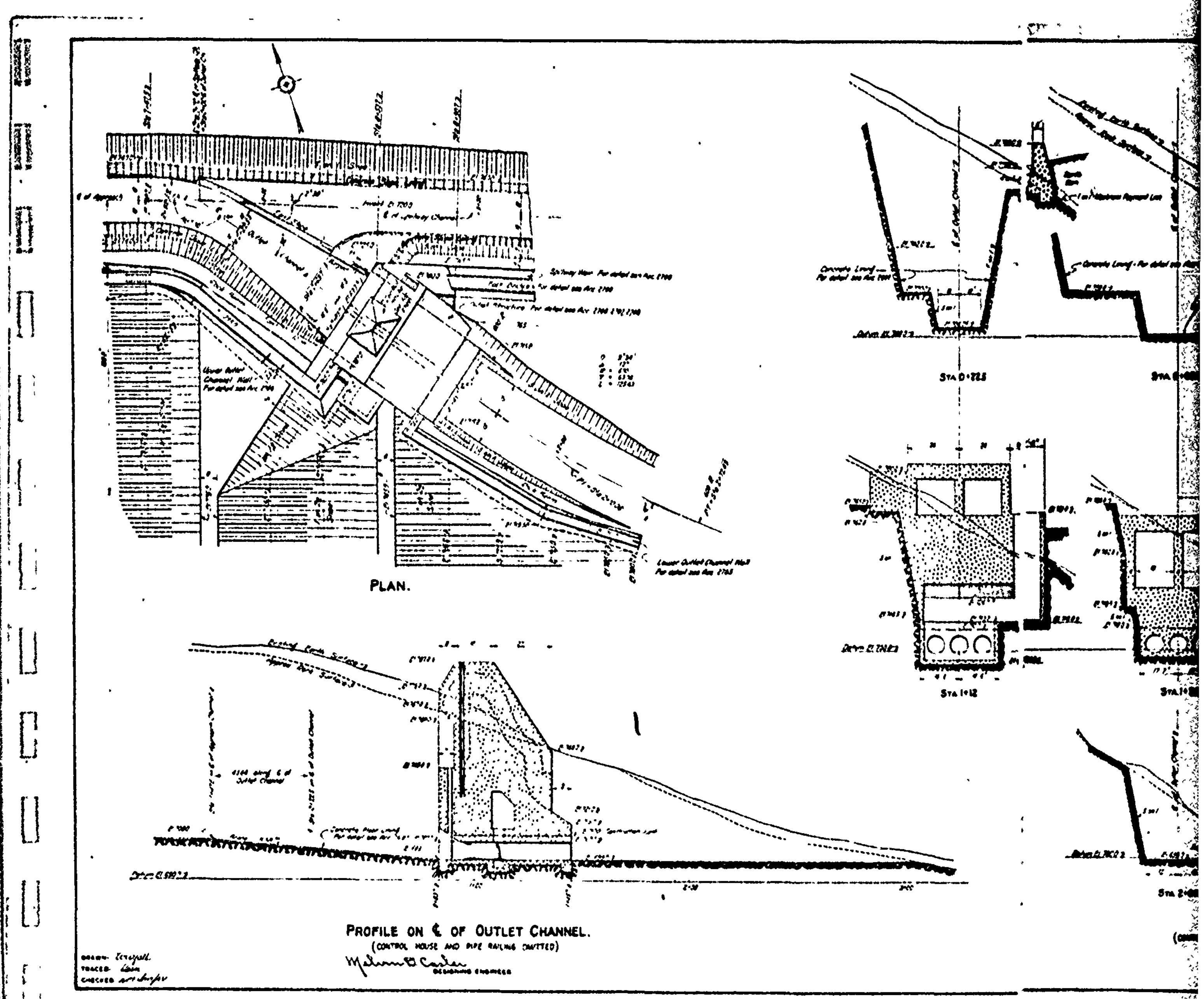

825
850
875
Rip Rap
CONSULTING ENGINEER
HUC
S



CONTRACT 4 SHEET 8
Rip Rap
Core Material
Existing surface to be stripped as per Specifications
Cut off Trench
Rock Fill
STA.105+30
STA.102+00
SECTIONS
NOTE
PROFILE
Existing Surface
Bottom of Cut off Trench
STATE OF NEW YORK
HUDSON RIVER REGULATING DISTRICT
SACANDAGA RESERVOIR
CONKLINGVILLE DAM
PROFILE AND SECTIONS
SEPT. 1927
CONSULTING ENGINEER
FILE
ACC. 2694

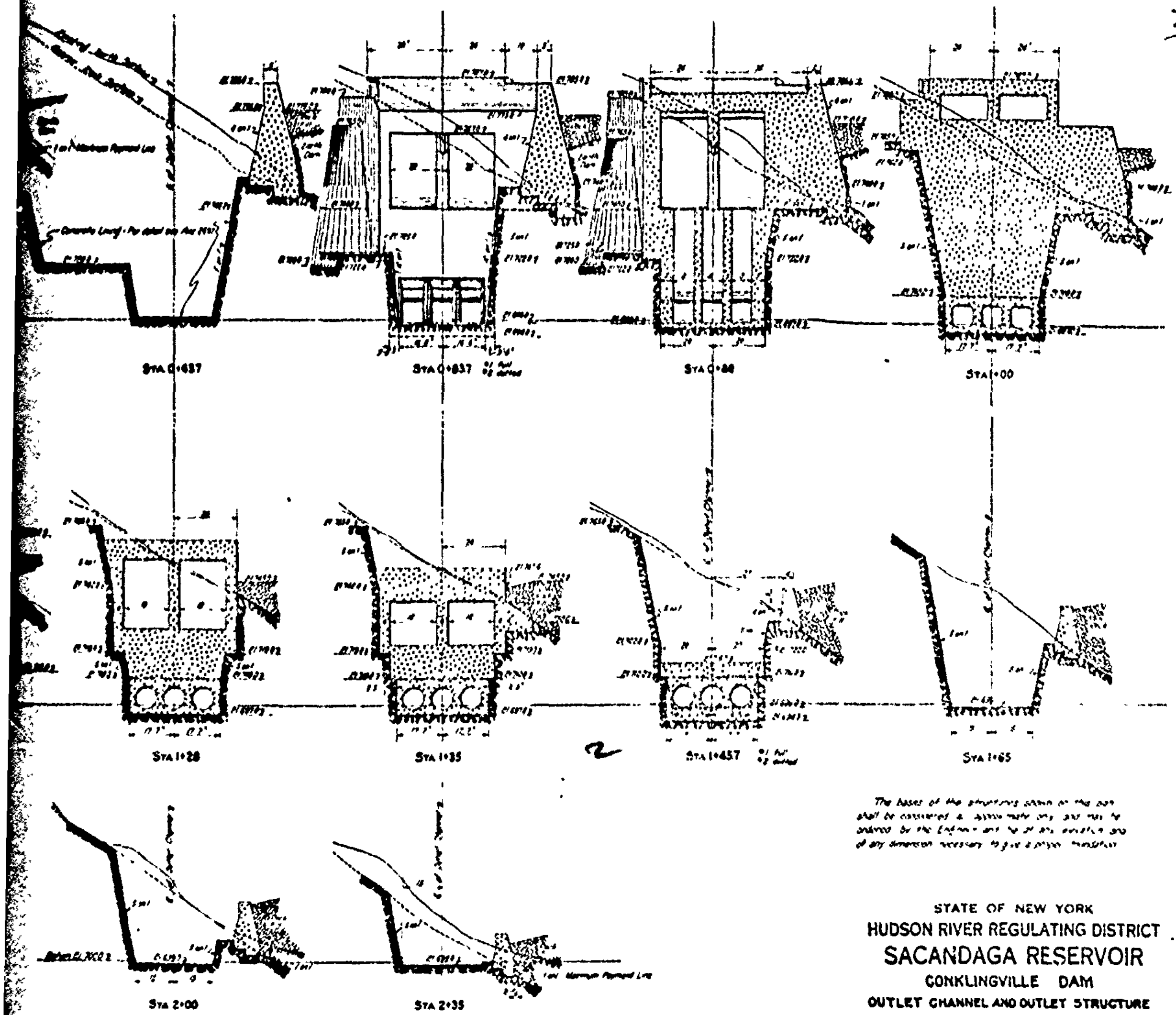


825
850
875
Rip Rap
CONSULTING ENGINEER
CONSULTING ENGINEER



PLAN.
Sta 0+22.5
Sta 1+12
PROFILE ON ℄ OF OUTLET CHANNEL.
(CONTROL HOUSE AND PIPE RAILING OMITTED)
DESIGNING ENGINEER

CONTRACT 4 SHEET 17
SHEETS IN SET 32



SECTIONS
(CONTROL HOUSE AND PIPE RAILING OMITTED)

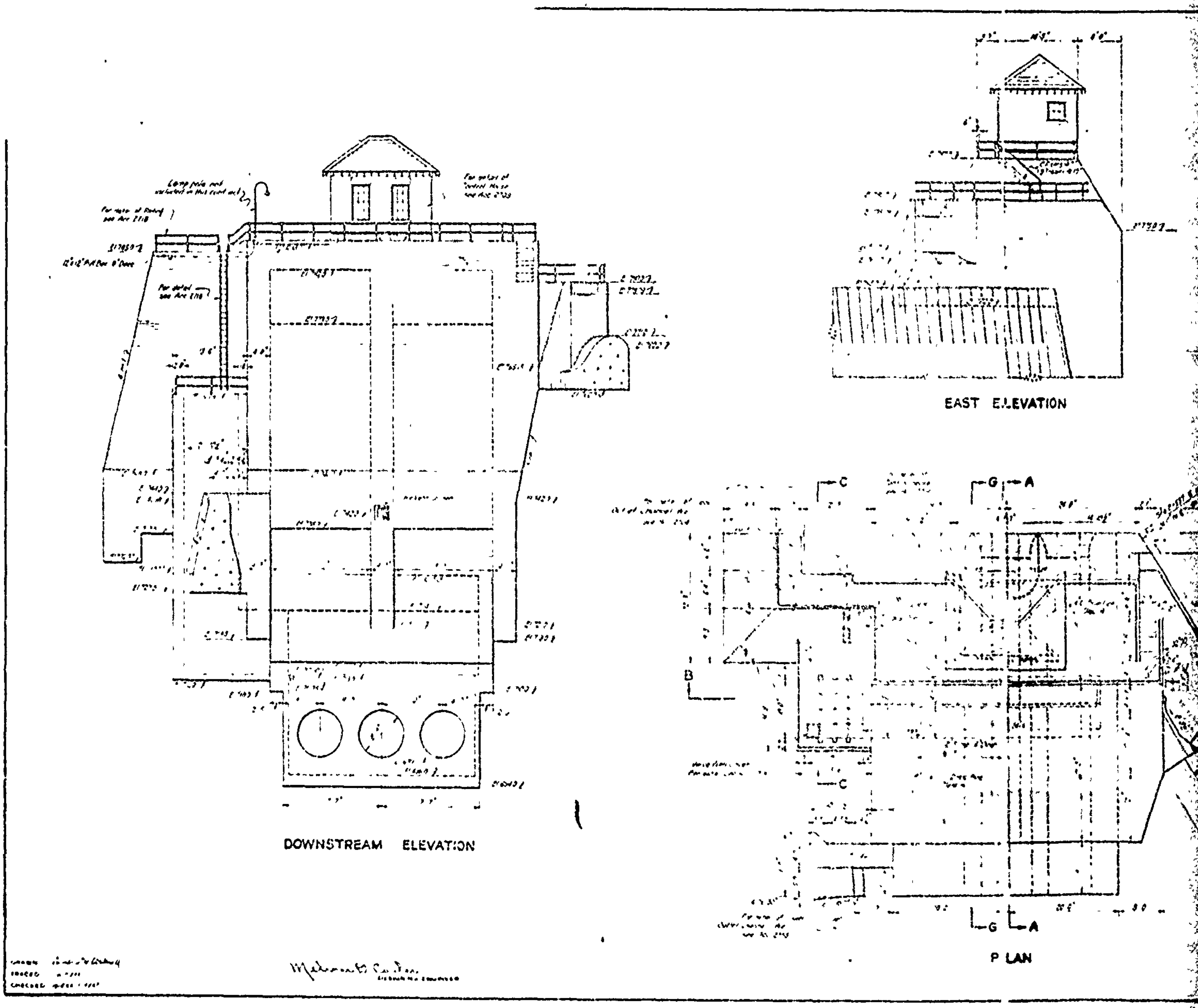
STATE OF NEW YORK
HUDSON RIVER REGULATING DISTRICT
SACANDAGA RESERVOIR
CONKLINGVILLE DAM
OUTLET CHANNEL AND OUTLET STRUCTURE

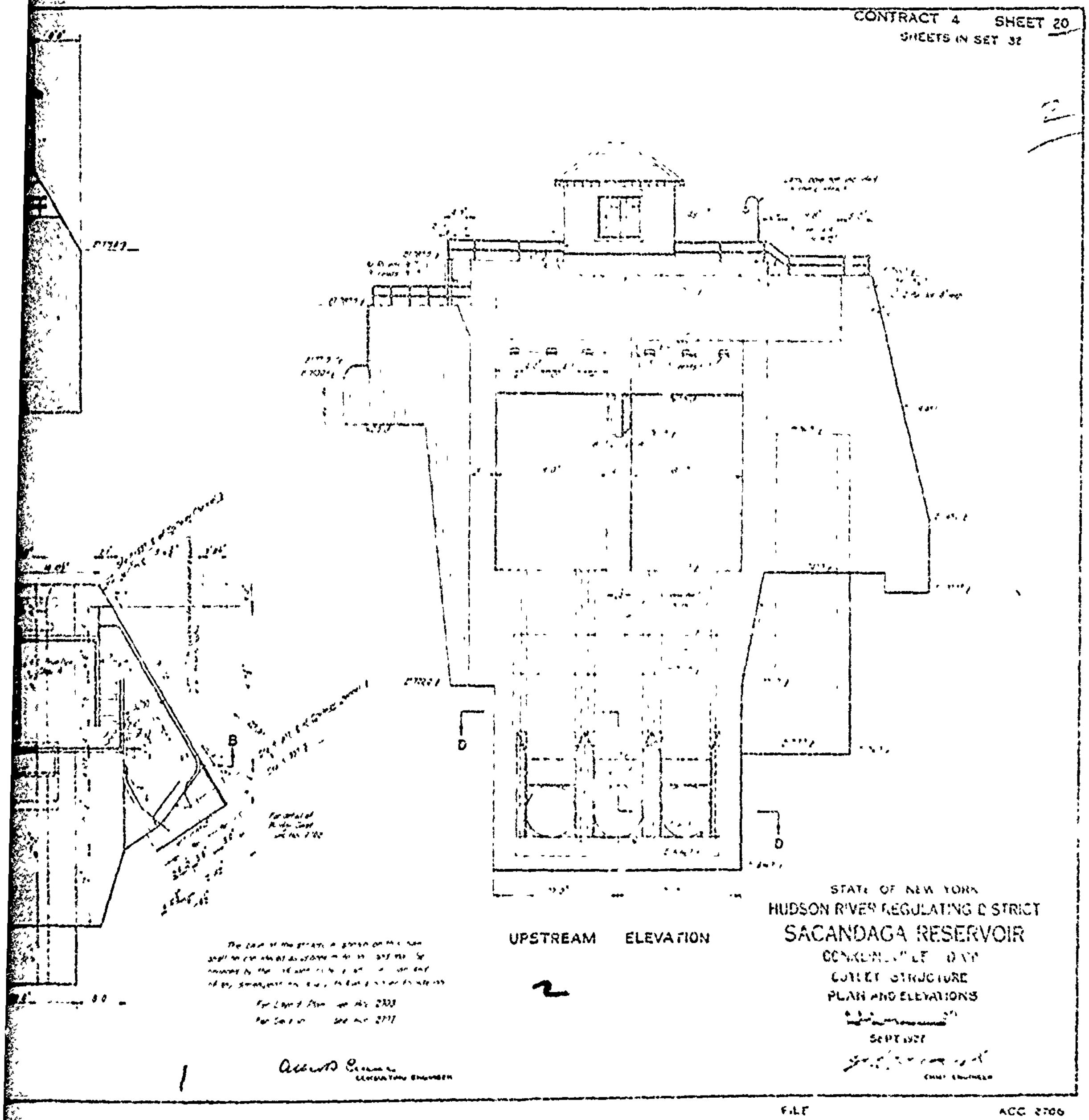
SEPT 1927

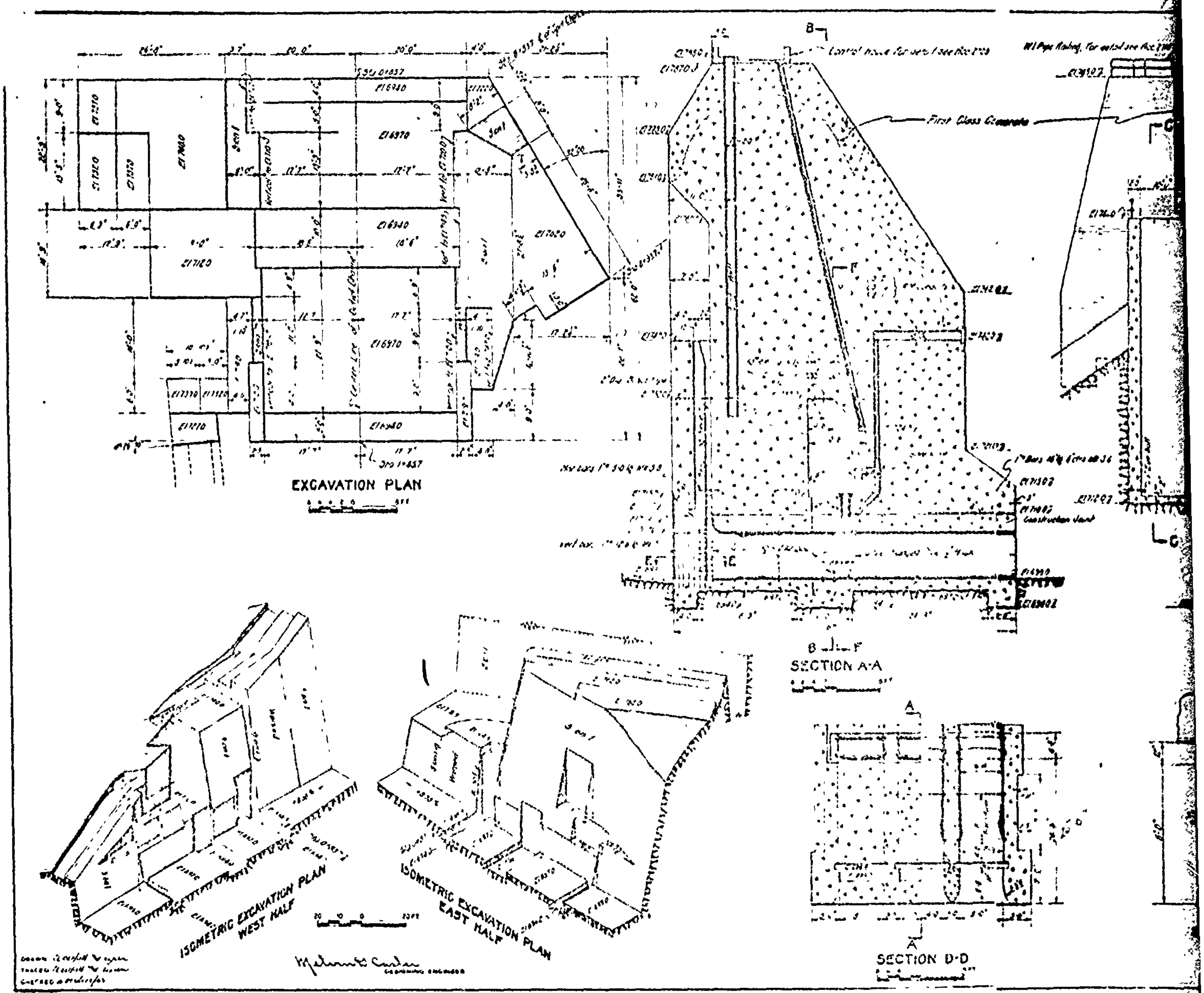
CONSULTING ENGINEER

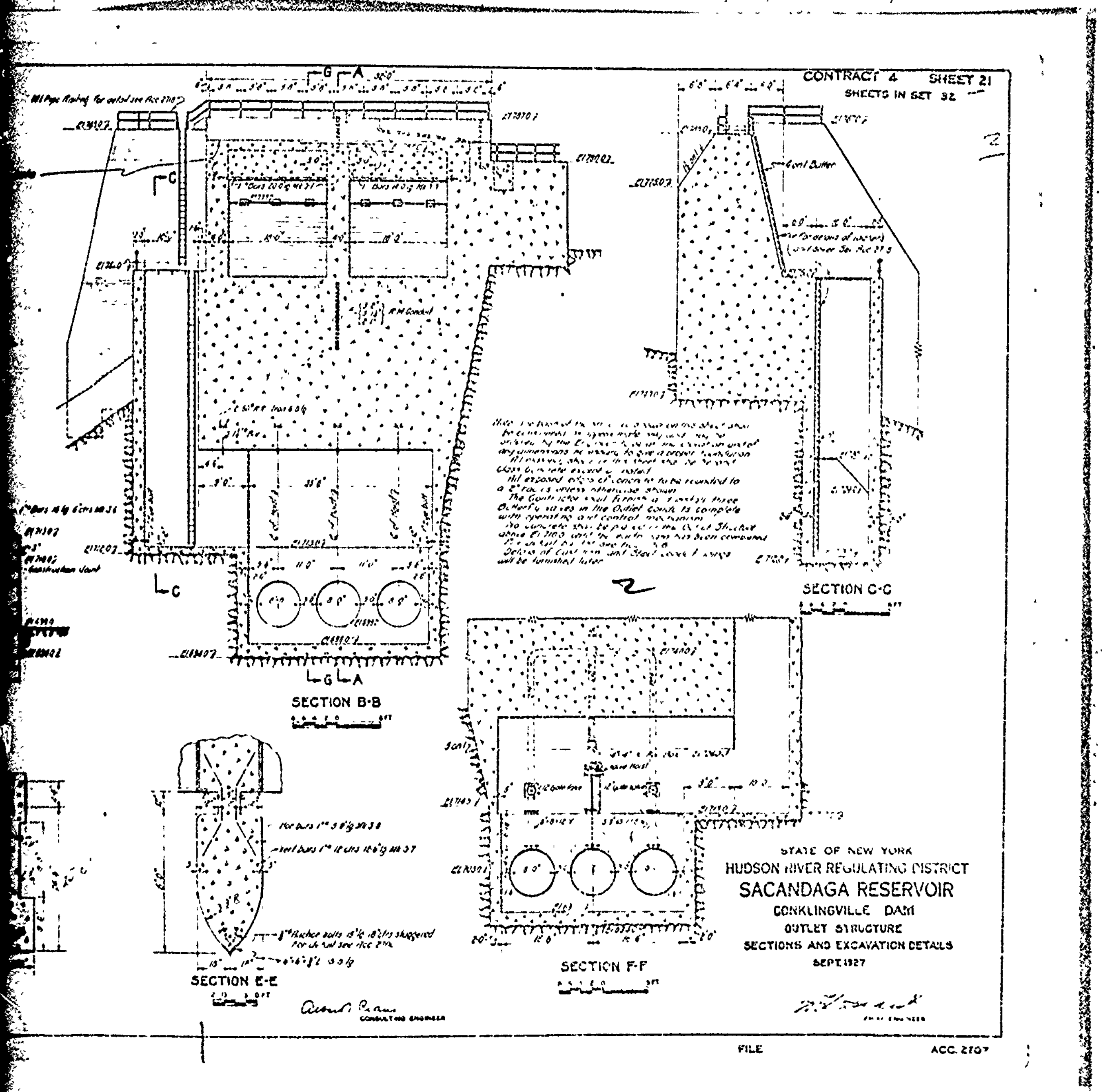
CHIEF ENGINEER

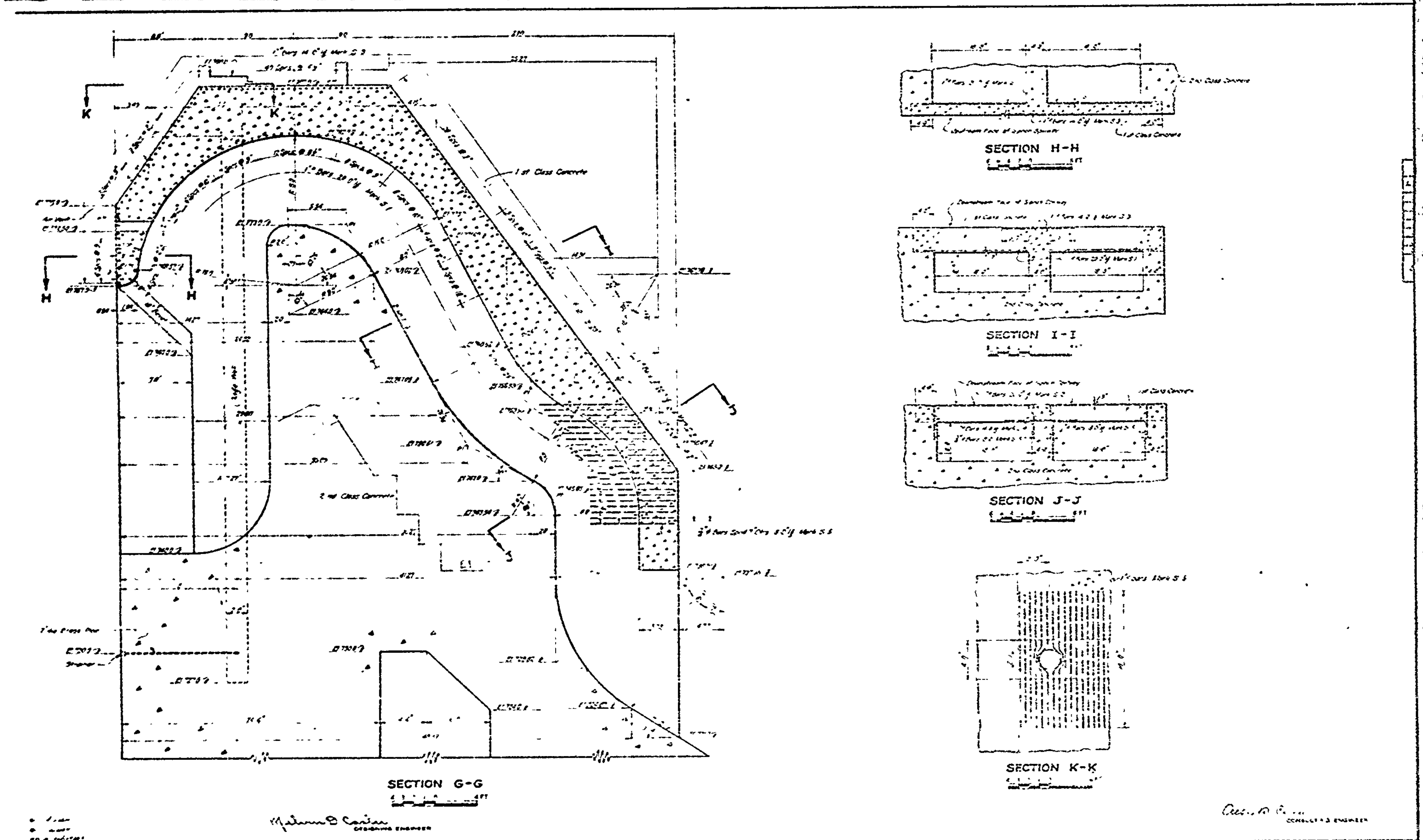
FILE ACC. 2703


EAST ELEVATION
DOWNSTREAM ELEVATION
PLAN
C
G
A
B


CONTRACT 4 SHEET 20
SHEETS IN SET 32
B
D
D
UPSTREAM ELEVATION
STATE OF NEW YORK
HUDSON RIVER REGULATING DISTRICT
SACANDAGA RESERVOIR
CONKLINGVILLE DAM
OUTLET STRUCTURE
PLAN AND ELEVATIONS
SEPT 1927
CHIEF ENGINEER
CONSULTING ENGINEER
FILE
ACC 2706


EXCAVATION PLAN
First Class Concrete
SECTION A-A
ISOMETRIC EXCAVATION PLAN
WEST HALF
ISOMETRIC EXCAVATION PLAN
EAST HALF
SECTION D-D


CONTRACT 4 SHEET 21
SHEETS IN SET 32
SECTION B-B
SECTION C-C
SECTION E-E
SECTION F-F
STATE OF NEW YORK
HUDSON RIVER REGULATING DISTRICT
SACANDAGA RESERVOIR
CONKLINGVILLE DAM
OUTLET STRUCTURE
SECTIONS AND EXCAVATION DETAILS
SEPT 1927
CONSULTING ENGINEER
CHIEF ENGINEER
FILE
ACC. 2707


1st Class Concrete
2nd Class Concrete
SECTION G-G
SECTION H-H
SECTION I-I
SECTION J-J
SECTION K-K
DESIGNING ENGINEER
CONSULTING ENGINEER

APPENDIX F

VISUAL CHECK LIST

CHECK LIST
VISUAL INSPECTION
PHASE 1

NAME DAM Conklingville Dam   COUNTY Saratoga   STATE New York   ID# NY 146

TYPE OF DAM Earthfill   HAZARD CATEGORY High

DATE(s) INSPECTION 6/16/78   WEATHER warm, clear   TEMPERATURE 75°

POOL ELEVATION AT TIME OF INSPECTION 766.15 M.S.L.   TAILWATER AT TIME OF INSPECTION 704.0 M.S.L.

INSPECTION PERSONNEL:

R. Jeffrey Kimball, P.E. - LRK   John Anderson - Engineer HRBRRD

James T. Hockensmith - LRK   Bob Allen - HRBRRD

James T. Hockensmith RECORDER

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None noted	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None noted	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None noted	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	Appeares to be good and stable. Settlement gauge readings discontinued after no movement recorded.	
RIPRAP FAILURES	None noted	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Appears to be good and stable.	
ANY NOTICEABLE SEEPAGE	None noted	
STAFF GAGE AND RECORDER	Pool level read daily and recorded	
DRAINS	None	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	N/A	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	N/A	
DRAINS	N/A	
WATER PASSAGES	N/A	
FOUNDATION	N/A	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N/A	
STRUCTURAL CRACKING	N/A	
VERTICAL AND HORIZONTAL ALIGNMENT	N/A	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS	N/A	
STAFF GAGE OF RECORDER:	N/A	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not observed - Three 8 foot diameter steel flanged pipes - not normally operated.	
INTAKE STRUCTURE	Intake control house operating three valves invert at 699.0.	
OUTLET STRUCTURE	Three 8 foot pipes discharge directly into Stewart Bridge Reservoir.	
OUTLET CHANNEL	Outlet channel is 100' long with concrete walls. Channel discharges directly into Stewart Bridge Reservoir.	
EMERGENCY GATE	No emergency gates on structures, dowell valves only.	

OUTLET WORKS - Through Power House

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not observed - Normal discharge is through spillway approach channel and into power house through gates. Power house operated by Niagra-Mohawk Power Company. Facilities unobserved.	
INTAKE STRUCTURE	Through gates adjacent to spillway approach channel. Normal discharge is 4,000 cfs.	
OUTLET STRUCTURE	Through power house and into Stewarts Bridge Reservoir.	
OUTLET CHANNEL	Stewarts Bridge Reservoir to Hudson - Fairly wide channel with steep hillside.	
EMERGENCY GATE	None	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	400 foot concrete weir in good condition. Several weep holes below weir are producing water through joints in rock.	
APPROACH CHANNEL	Approximately 400 feet long and 20 foot wide cut into rock and concrete retaining walls. Water flowing in channel and bottom unobserved. Appears to be in good condition.	
DISCHARGE CHANNEL	Discharge over weir and down rock cut (about 80' vertical) and discharges in Sacandaga River and Stewart Bridge Reservoir.	
BRIDGE AND PIERS	None	

UNGATED SPILLWAY - Siphon

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Unobserved - in control house concrete weir at elevation 773 feet - Self priming at elevation 773 feet. Siphon inlets two 8 x 18' openings.	
APPROACH CHANNEL	Approach channel same as other spillways - rock cut with a concrete retaining wall.	
DISCHARGE CHANNEL	30 feet wide outlet channel - concrete lined with retaining walls - in good condition. Same as pipe outlet channel.	
BRIDGE AND PIERS	None	

OUTLET WORKS – Outlet Structure

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Three 8 foot steel pipes. Exit and entrance inverts at 699.0'.	
INTAKE STRUCTURE	Sluice gate over end of 8 foot pipe.	
OUTLET STRUCTURE	8 foot pipe discharges directly to outlet channel.	
OUTLET CHANNEL	30 foot wide concrete channel with retaining walls.	
EMERGENCY GATE	None	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Sacandaga River and Stewarts Bridge Reservoir. wide and flat.	
SLOPES	Side slopes moderately steep but stable.	
APPROXIMATE NO. OF HOMES AND POPULATION	Several thousand people.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Gently rolling to moderately steep - stable.	
SEDIMENTATION	Sedimentation has not been a problem nor is expected to be.	

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
Settlement plates	Very little settlement in past. Not currently read.	

APPENDIX G

ENGINEERING DATA CHECK LIST

ITEM	REMARKS	item held by
DESIGN REPORTS	Unknown	
GEOLOGY REPORTS	"Report on the north abutment of the Conklingville Dam" by Irving B. Crosby, Geologist, April, 1928.	Owner
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Sipon spillway computations	Owner
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	Soil test pits and borings logs Grain size (blue prints)	New York State Department of Environmental Conservations
POST-CONSTRUCTION SURVEYS OF DAM	Unknown	
BORROW SOURCES	Mostly on right abutment - details unknown	

ITEM	REMARKS	item held by
MONITORING SYSTEMS	Settlement pipes	Owner
MODIFICATIONS	None	
HIGH POOL RECORDS	Yearly hydrograph of Hudson River at Spier Falls - Daily Reservoir Records	Owner
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Asphalt grouting Brief report on design changes	Owner
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None	
MAINTENANCE OPERATION RECORDS	Complete records of dam	Owner

	REMARKS	item held by
SPILLWAY PLAN	Contract Drawings	Owner
SECTIONS	Contract Drawings	Owner
DETAILS	Contract Drawings	Owner
OPERATING EQUIPMENT PLANS & DETAILS	Contract Drawings	Owner

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 1,050 square miles - gently rolling, wooded

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): variable high (771)- 1.16 mill. ac-ft low (740)- est.3 mill.ac-ft

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 771' - 1.16 million acre-feet

ELEVATION MAXIMUM DESIGN POOL: 778.95'

ELEVATION TOP DAM: 795.0'

CREST: Spillway

a. Elevation 771.0'
b. Type Concrete ogee
c. Width ogee section - see drawings for details
d. Length 400'
e. Location Spillover Left abutment
f. Number and Type of Gates None

OUTLET WORKS:

	Through Power House	Outlet Structure
a. Type	Three sluice gates	Three 8' pipes
b. Location	end of approach channel	base of control house
c. Entrance inverts	approximately 761'	699'
d. Exit inverts	approximately 700'	699'
e. Emergency draindown facilities	None	Yes

HYDROMETEOROLOGICAL GAGES:

a. Type	Rainfall & snow surveys	Continuous pool level record	Gaging Station
b. Location		Control house	Downstream
c. Records		Continuous	Daily

MAXIMUM NON-DAMAGING DISCHARGE Elevation 770.75' discharge 10,000 cfs maximum to date

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MODIFICATIONS	None	
HIGH POOL RECORDS	Yearly hydrograph of Hudson River at Spier Falls - Daily Reservoir Records	Owner
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Asphalt grouting Brief report on design changes	Owner
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None	
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